

Adverse Childhood Experiences

*Connecting a Developmental
Lens to the Health of Society*

Robert MD, MS,
ACE Study Concepts

ACEstudy.org

ACEsTooHigh.com

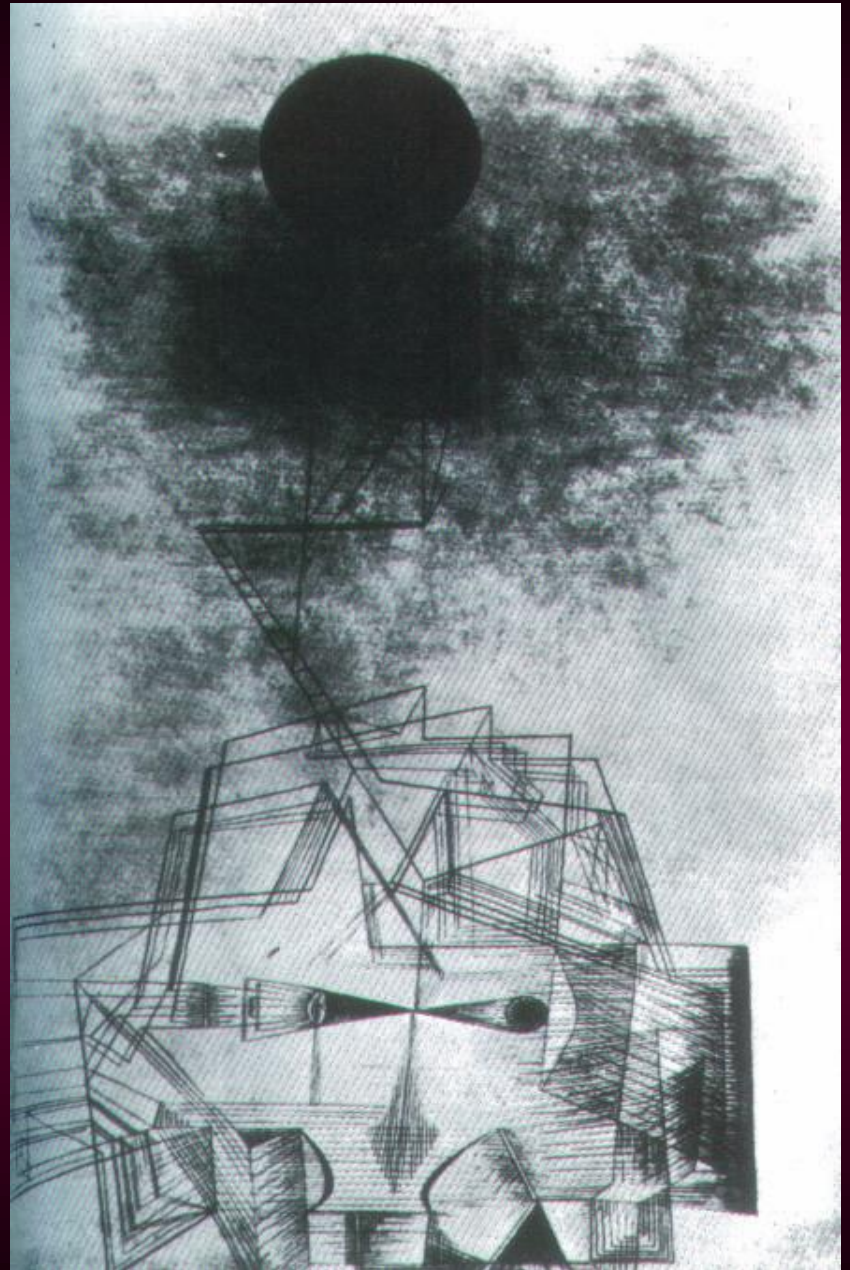
“In the brain, as in the economy, getting it right the first time is ultimately more effective and less costly than trying to fix it later. “

James Heckman
Nobel Laureate Economist

National Scientific Council
on the Developing Child, Perspectives:
The Cradle of Prosperity. (2006).
<http://www.developingchild.net>

Limits of Understanding

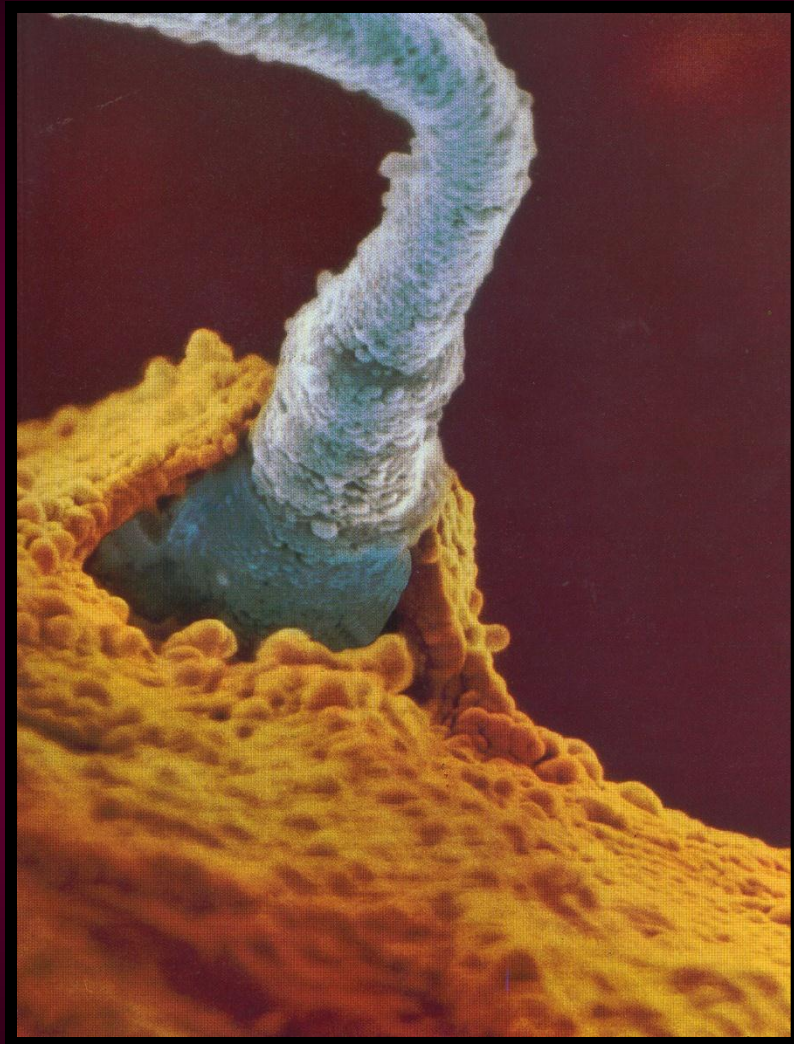
by Paul Klee
(1879-1940)

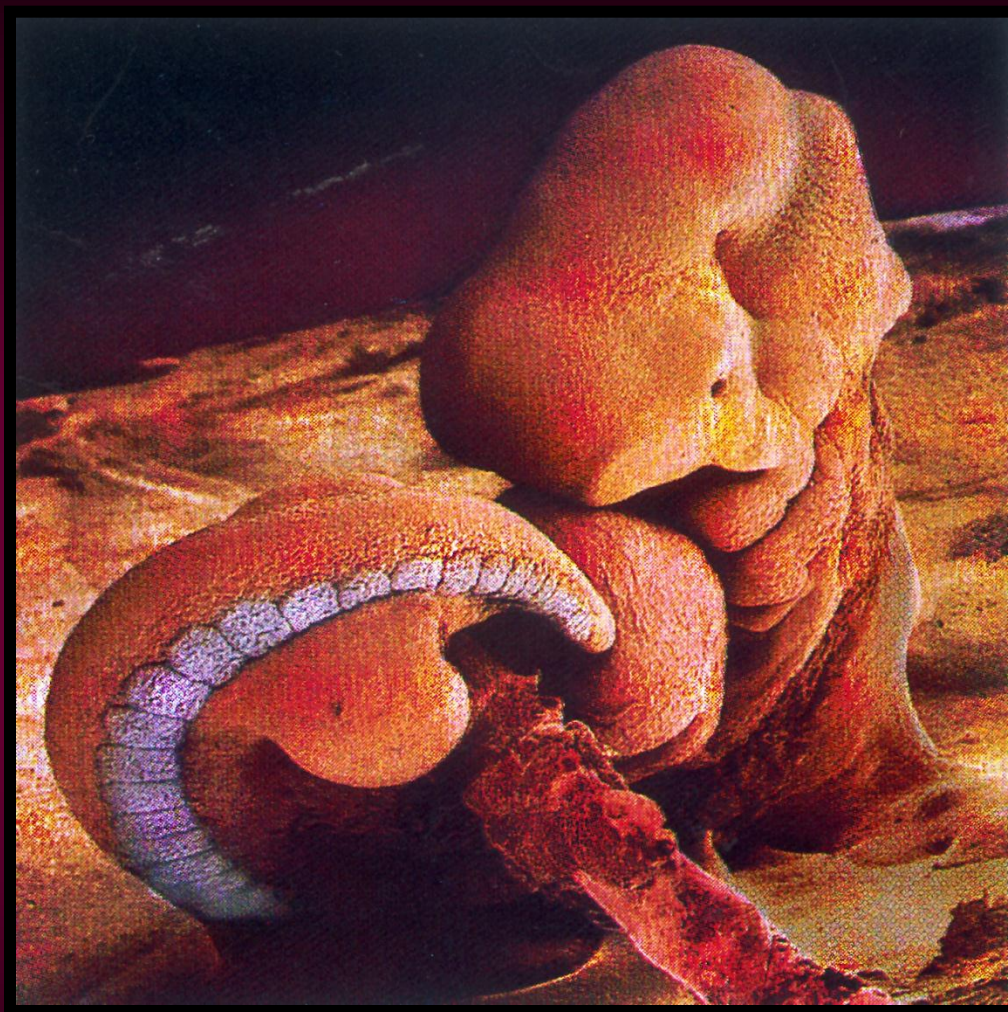


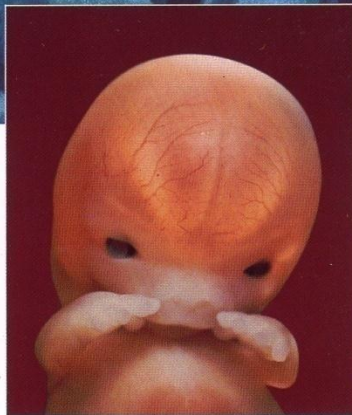
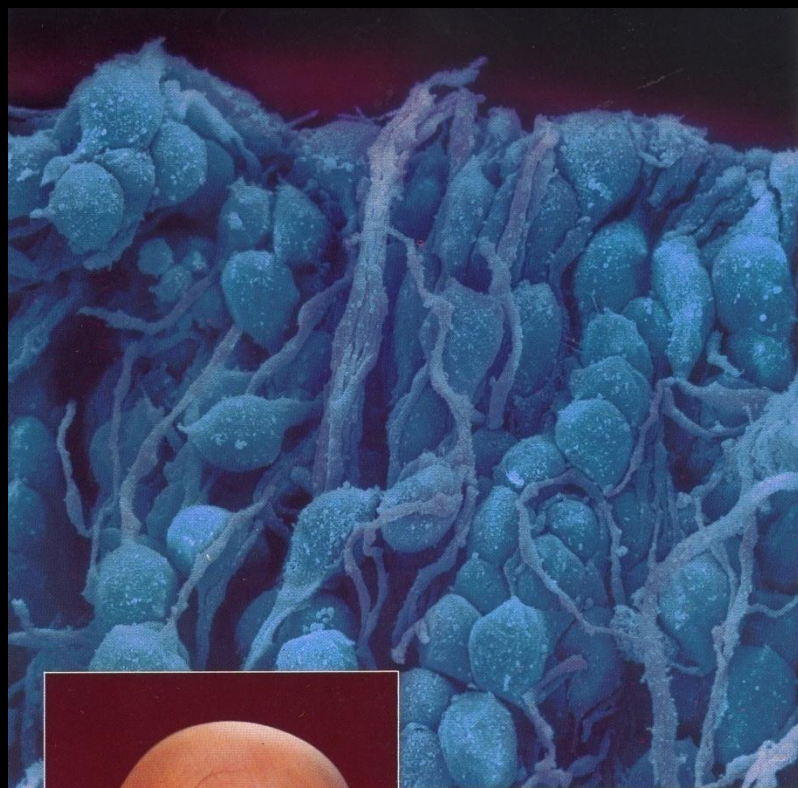


“The Creation of Adam”

Michelangelo 1508–1512







Early connections in the brain

The brain is undoubtedly one of nature's most remarkable creations: cells that can react to impulses, analyze and control behavior. As early as in the seventh week, nerve cells in the brain have begun to touch one another by means of projections, and some have even become connected in primitive nerve paths. The picture *above* shows nerve cells at this time, greatly enlarged. The rate of production is tremendous: 100,000 new nerve cells are created every minute, and by the time the baby is born, there will be some 100 billion. *Left*, the posterior lobes of the cerebrum shimmer through the skin of the forehead.

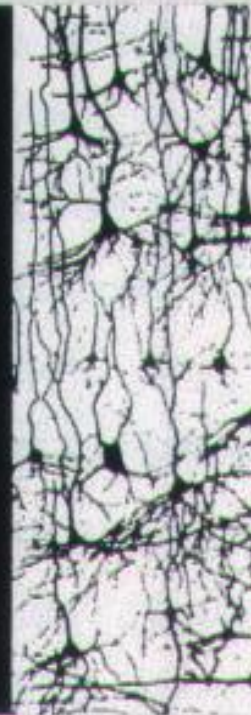
At Birth



6 Years Old



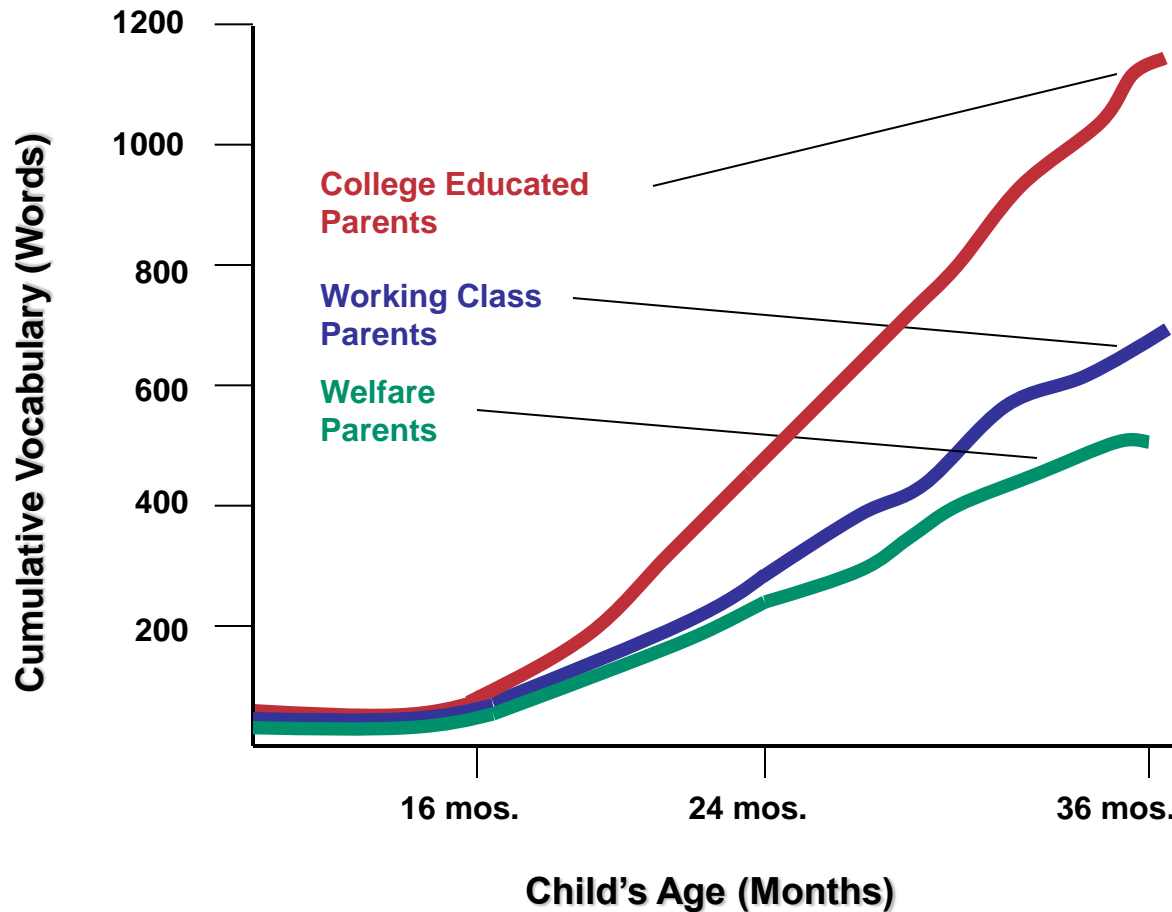
14 Years Old



SYNAPTIC DENSITY: Synapses are created with astonishing speed in the first three years of life. For the rest of the first decade, children's brains have twice as many synapses as adults' brains.

Drawings supplied by H.T. Chugani.

Barriers to Educational Achievement Emerge at a Very Young Age



Source: Hart & Risley (1995)

5 Days



2 Months



1 Year

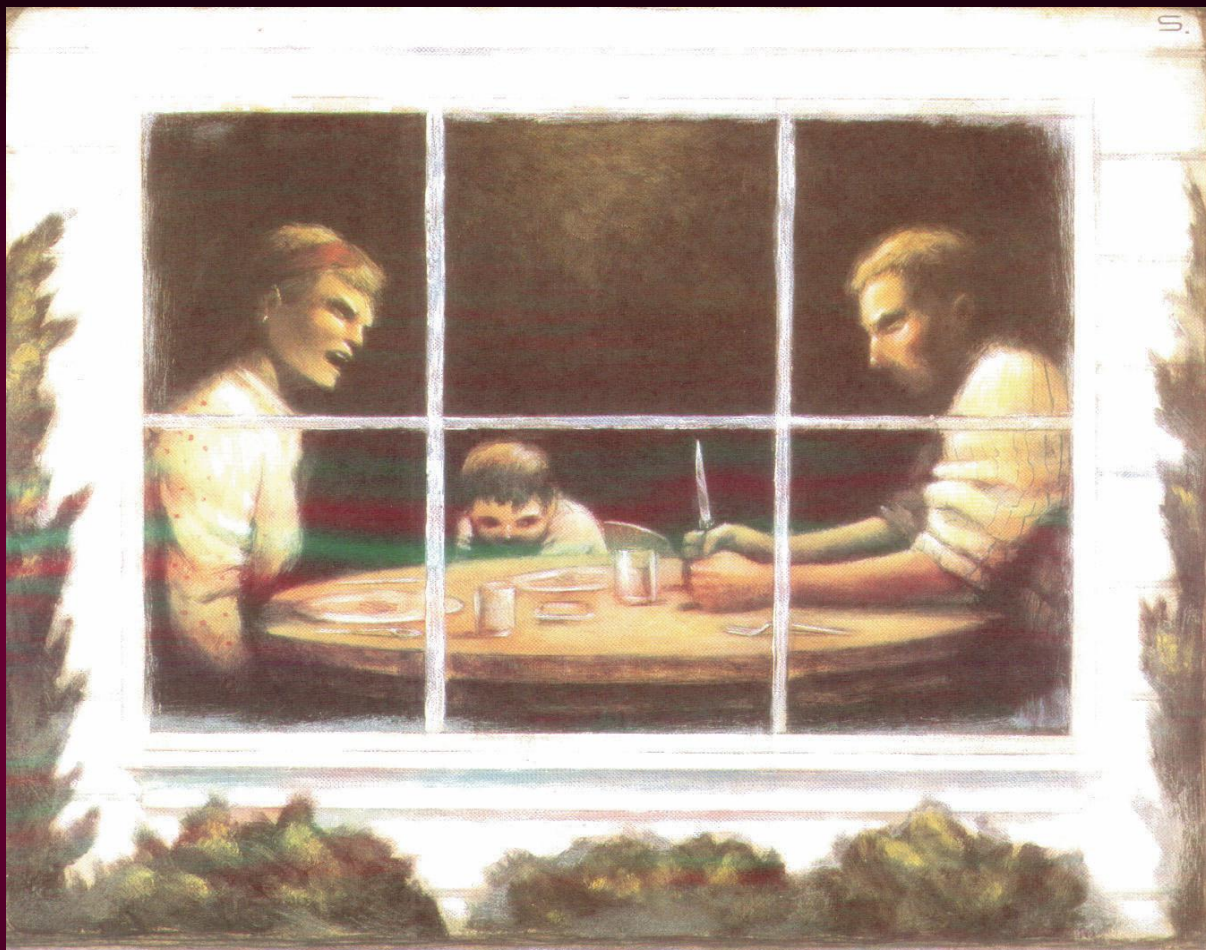


28 Years



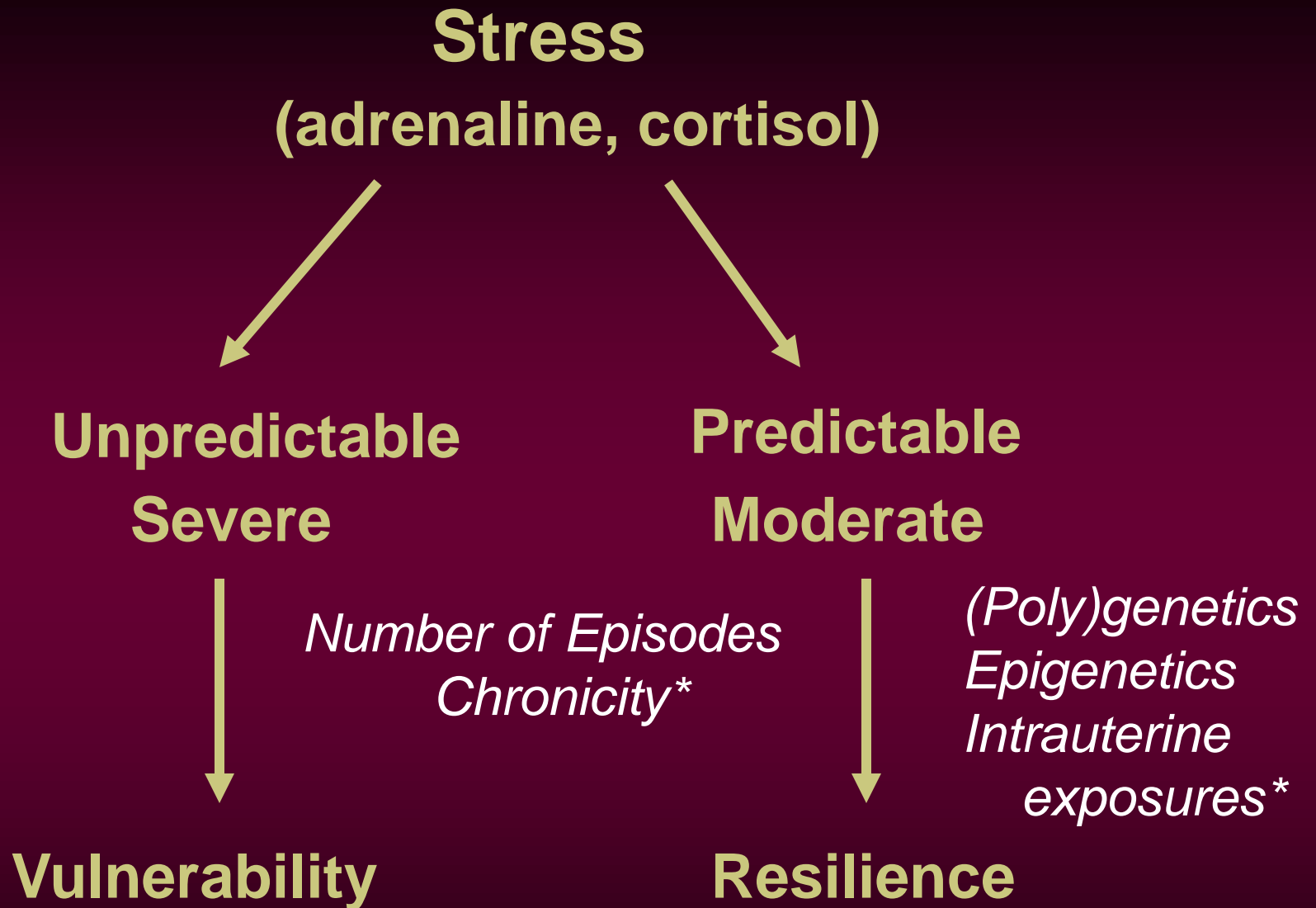
RAPID EARLY DEVELOPMENT: These PET scans suggest that the brain of a one year old more closely resembles an adult's brain than a newborn's.

Source: H.T. Chugani

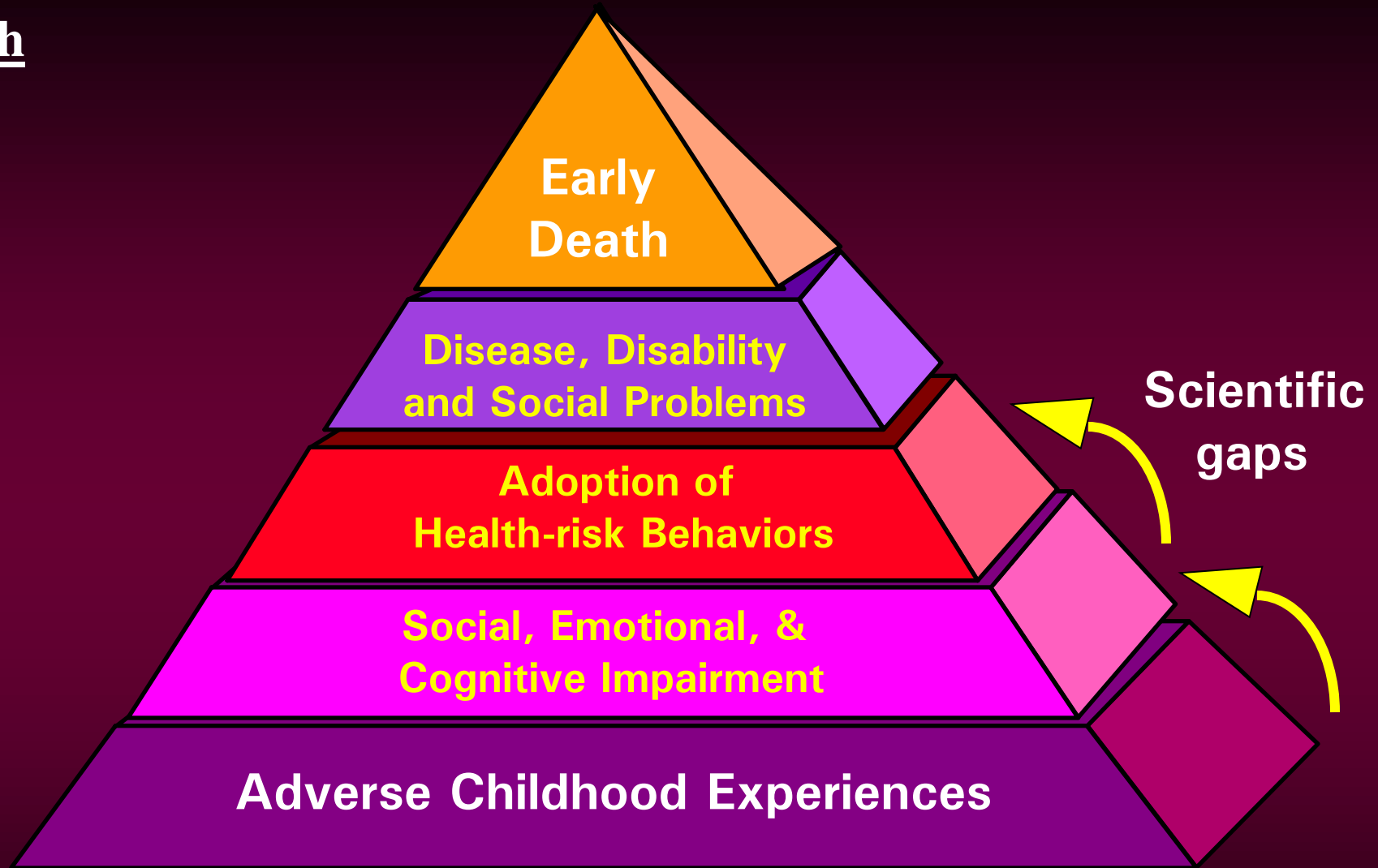


Seeing the Pain

America's physicians confront family violence



Death



Scientific
gaps

Adverse Childhood Experiences

**Social, Emotional, &
Cognitive Impairment**

**Adoption of
Health-risk Behaviors**

**Disease, Disability
and Social Problems**

**Early
Death**

Conception

The Adverse Childhood Experiences (ACE) Study

Examines the health and social effects of ACEs throughout the lifespan among 17,421 members of the Kaiser Health Plan in San Diego County

A Primary Care Setting...

Educated...

Middle Class..

Predominantly White...

ACE Study Design

Survey Wave I
(N = 9,508)

Follow-up

N = 17,421

Survey Wave II
(N = 8,667)

Mortality

National Death Index

Morbidity

Hospital Discharge

Outpatient Visits

Emergency room
visits

Pharmacy Utilization

*Comprehensive medical
Evaluations abstracted*

Adverse Childhood Experiences Are Common

Household dysfunction:

Substance abuse	27%
Parental sep/divorce	23%
Mental illness	17%
Battered mother	13%
Criminal behavior	6%

Abuse:

Psychological	11%
Physical	28%
Sexual	21%

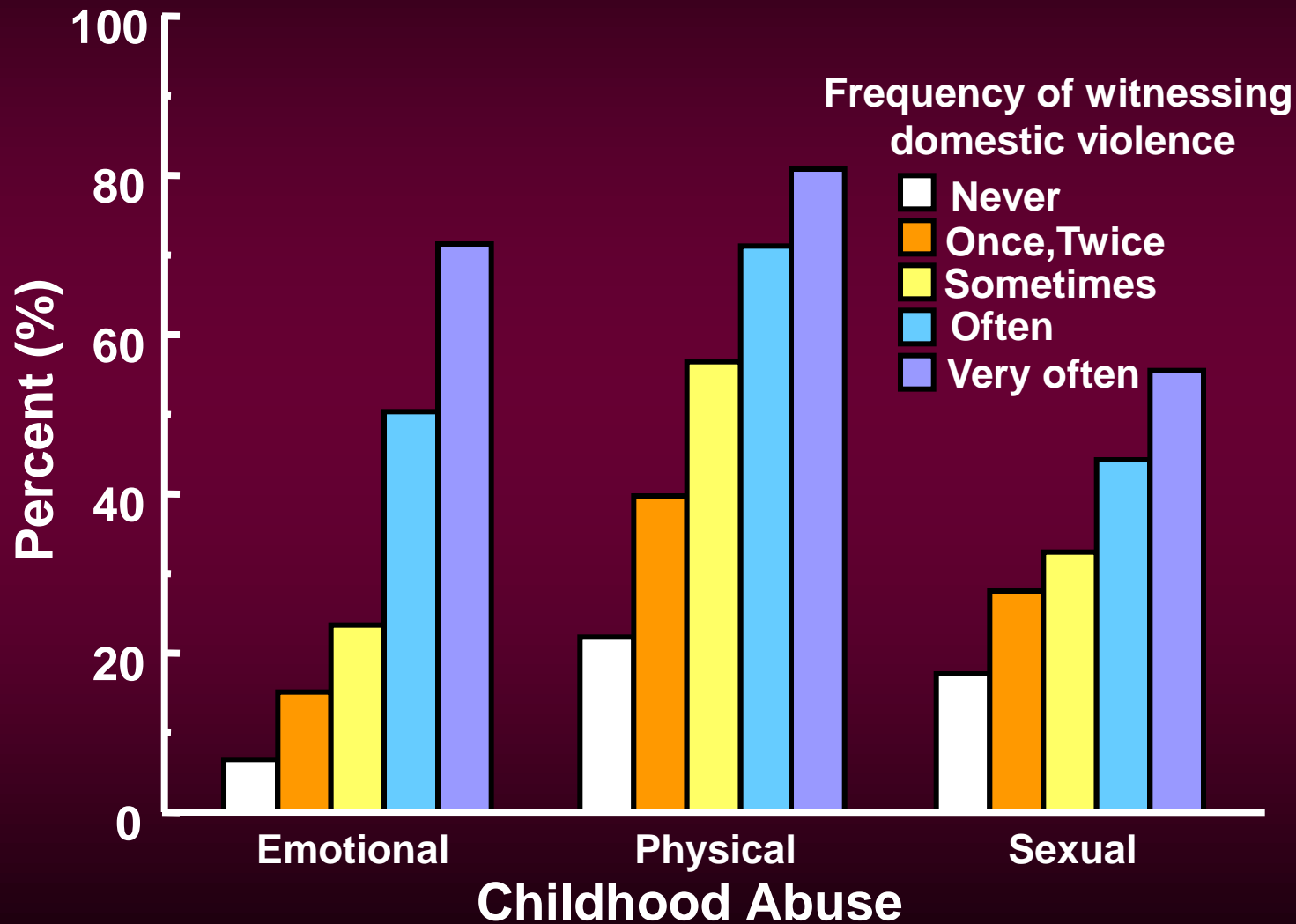
Neglect:

Emotional	15%
Physical	10%

**Adverse Childhood Experiences Rarely
Occur in Isolation...**

They come in groups.

Prevalence of Childhood Abuse by Frequency of Witnessing Domestic Violence



ACEs tend to come in groups...

Additional ACEs (%)

	1	2	3	4	<u>≥</u> 5
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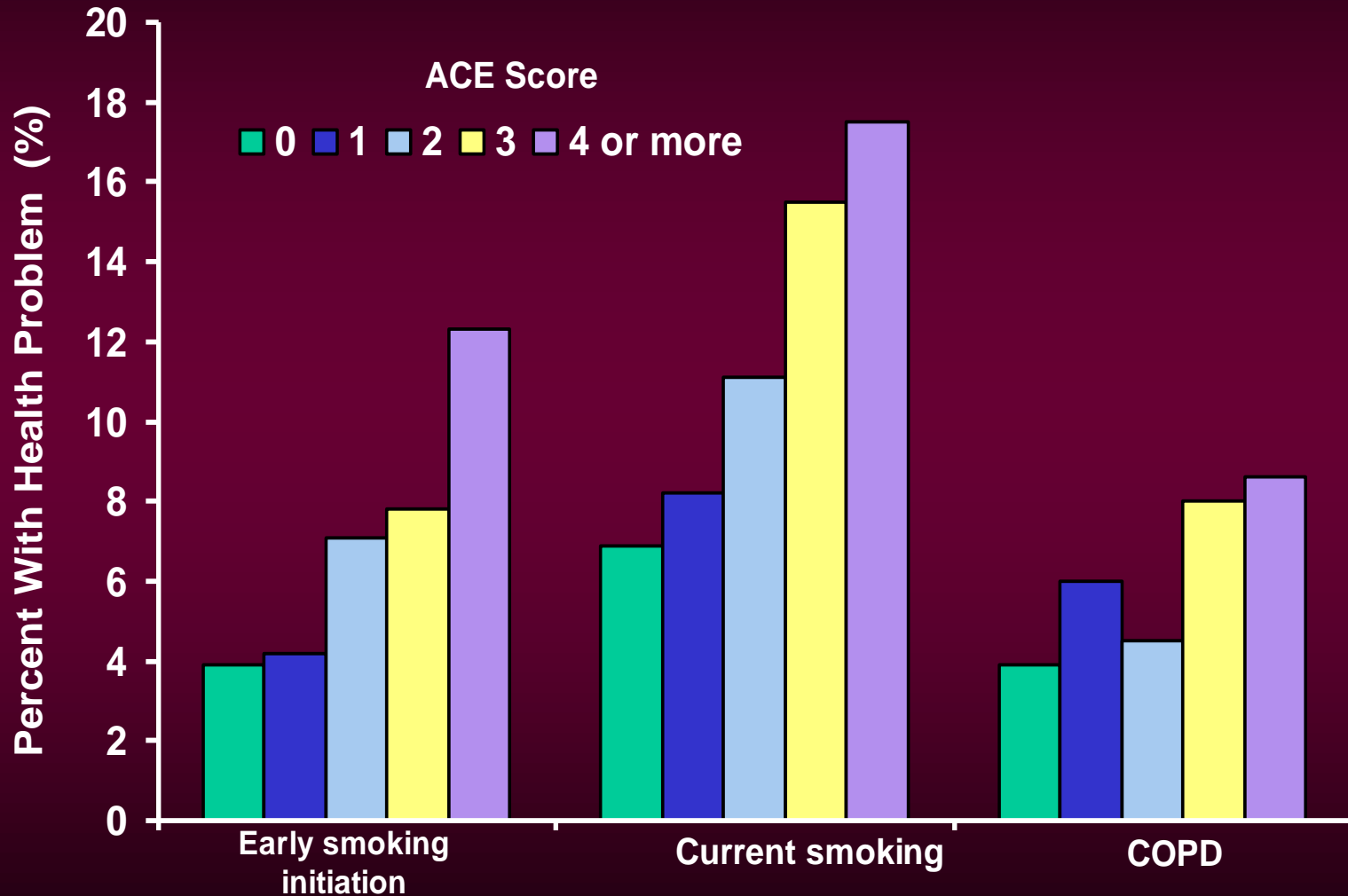
If you had:

A battered mother	95	82	64	48	52
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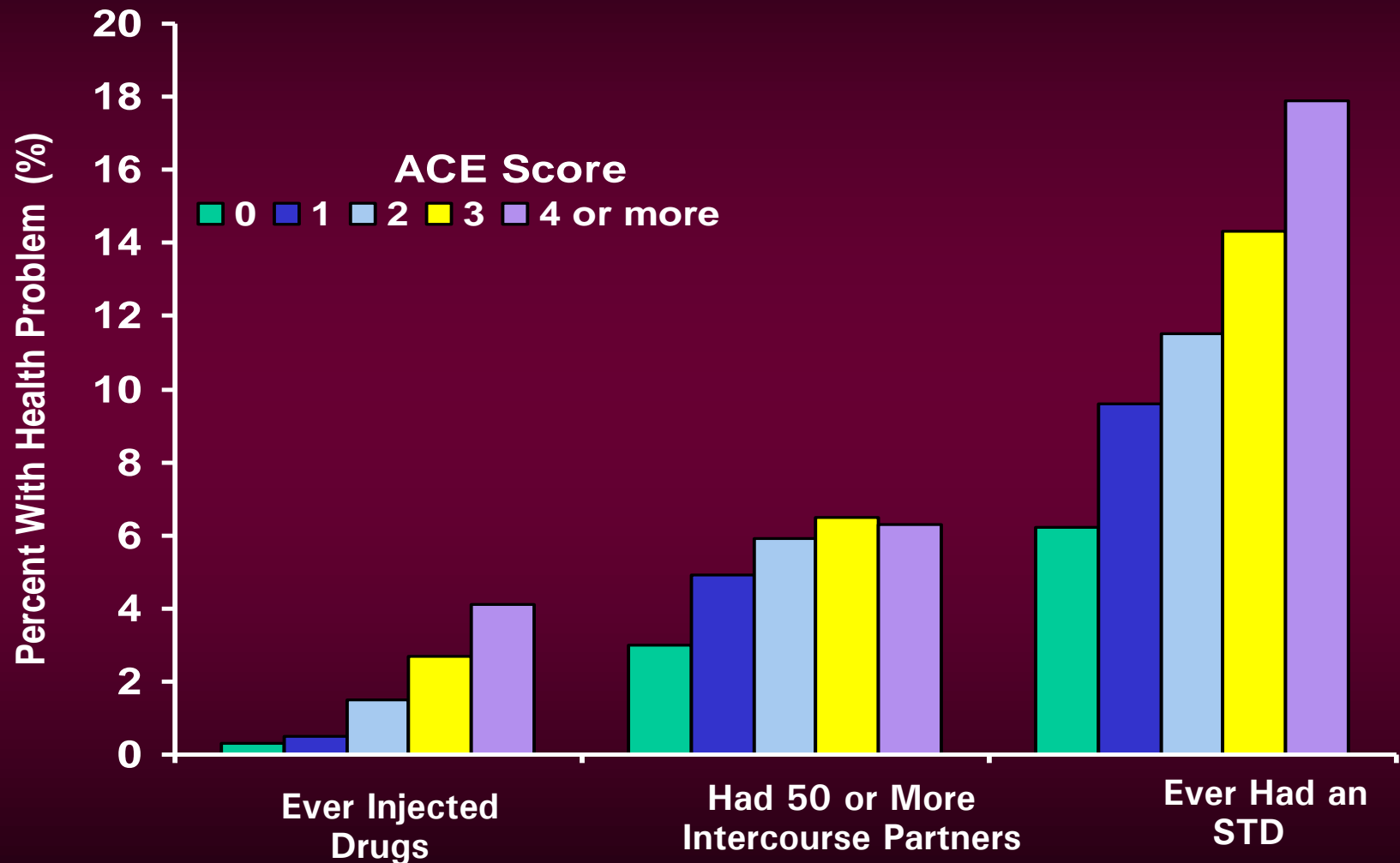
Adverse Childhood Experiences Score Biologic Stress “Dose”

<u>ACE Score</u>	<u>Prevalence</u>
0	33%
1	26%
2	16%
3	10%
4 or more	16%

ACEs, Smoking, and Lung Disease

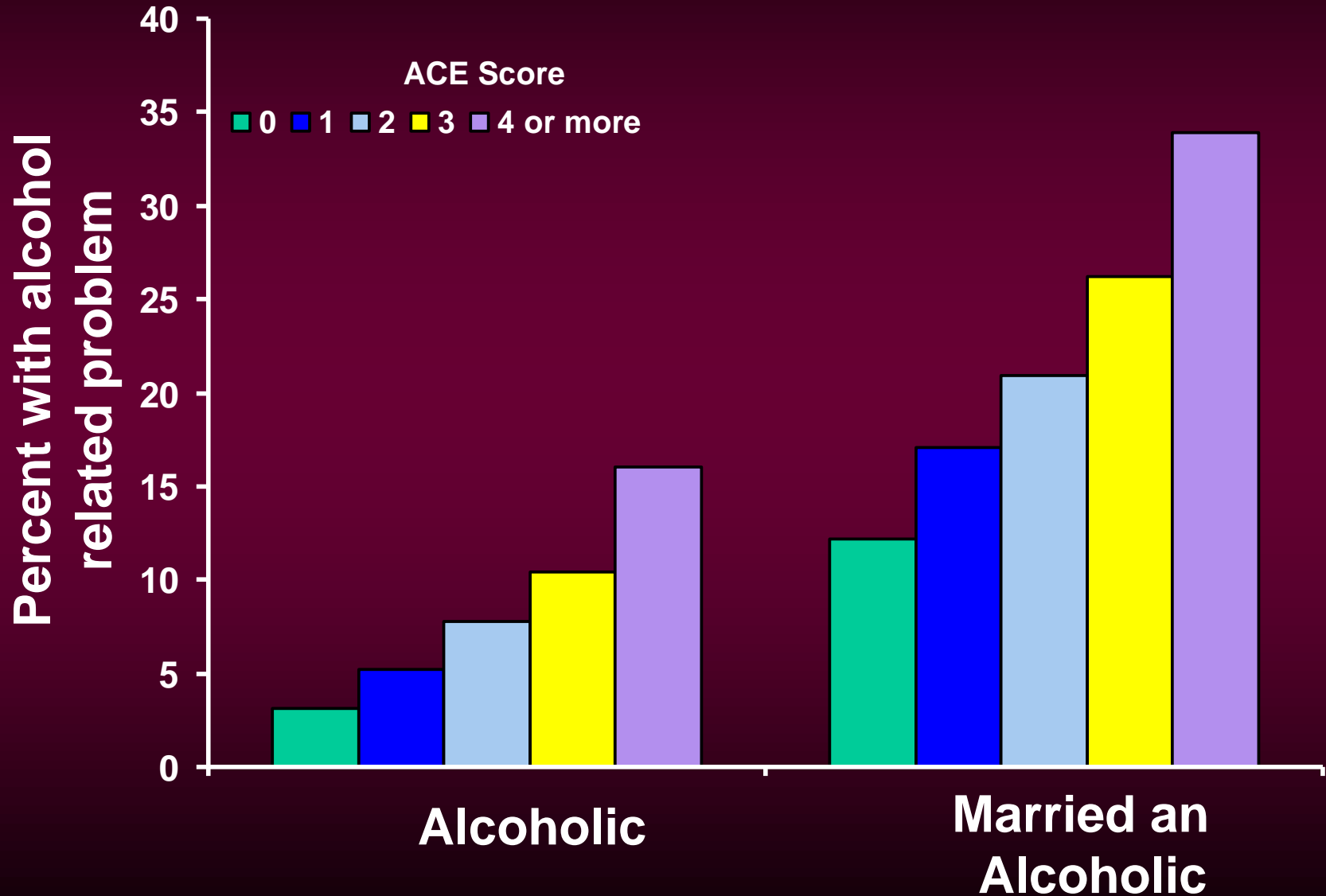


ACE Score and HIV Risks

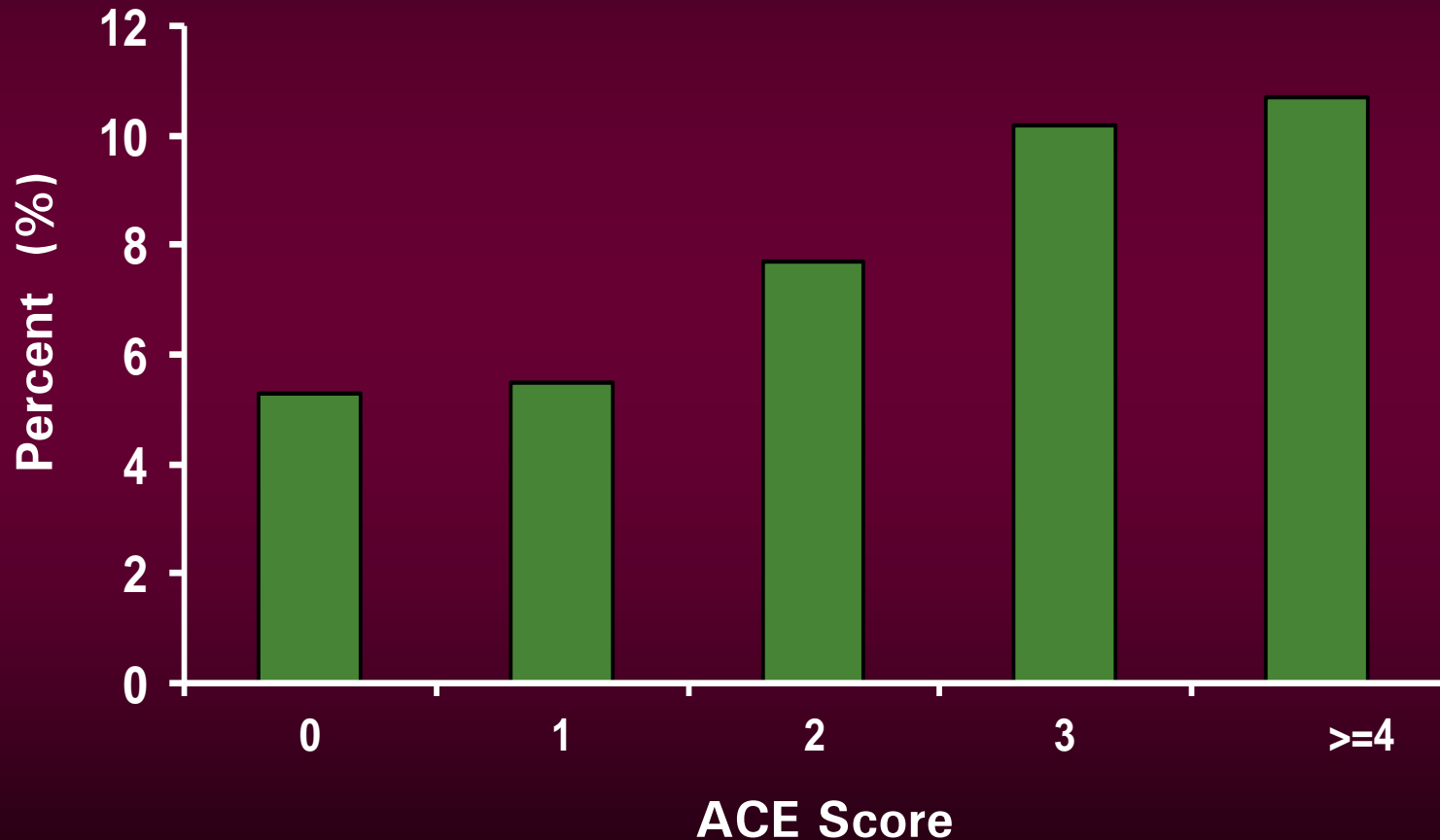


The ACE Score...

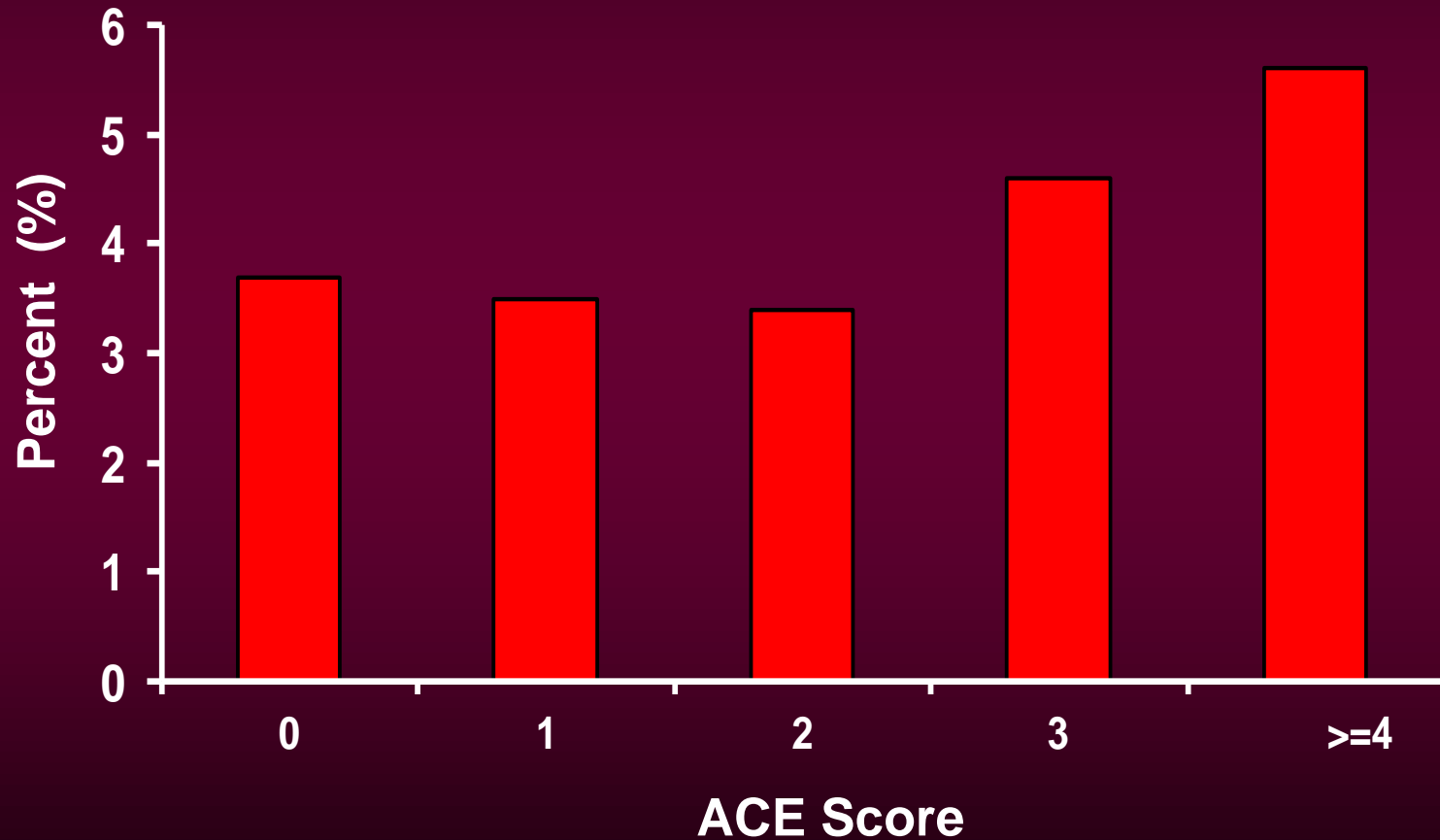
Alcohol Use and Abuse



The ACE Score and the Prevalence of Liver Disease (Hepatitis/Jaundice)

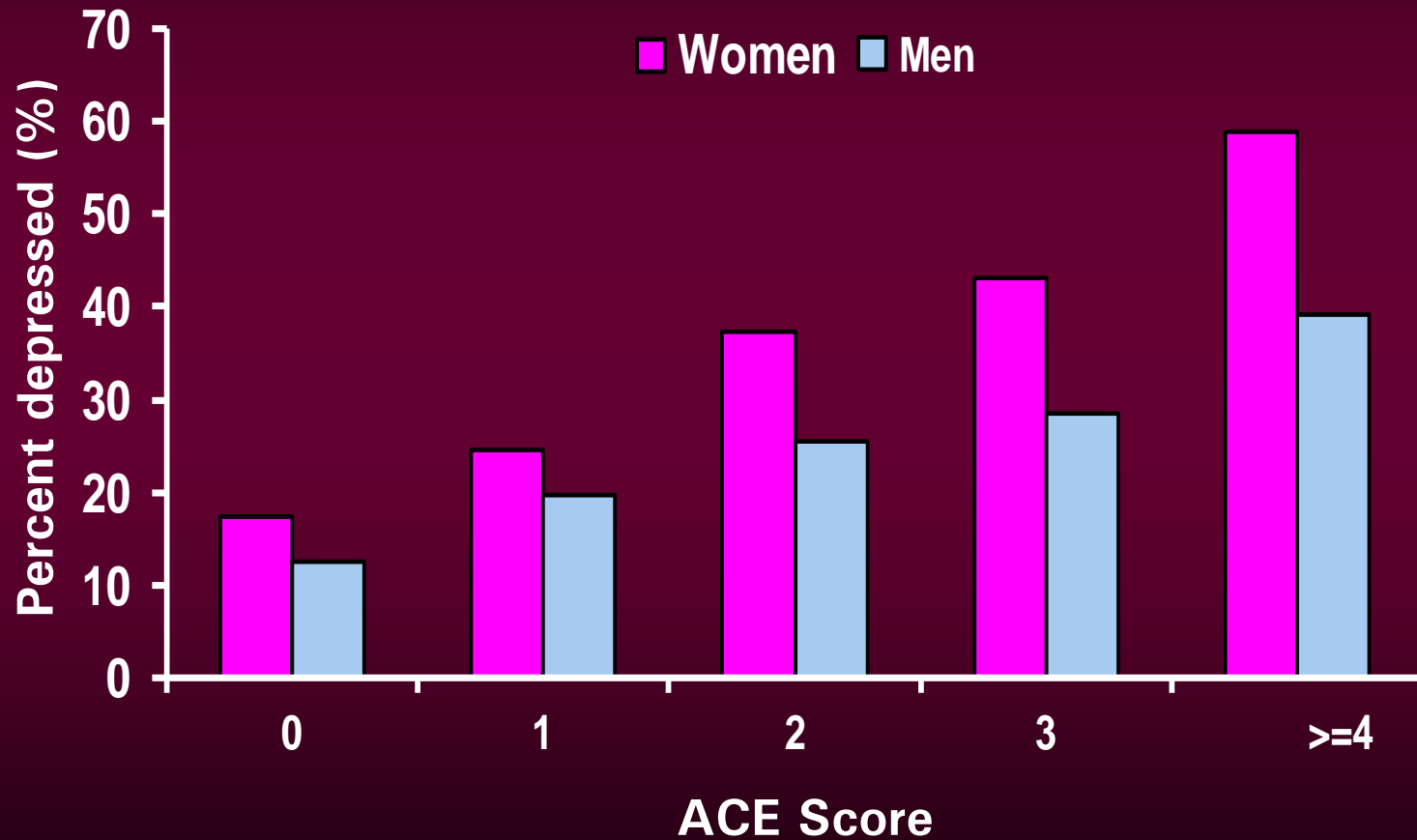


The ACE Score and the Prevalence Ischemic Heart Disease

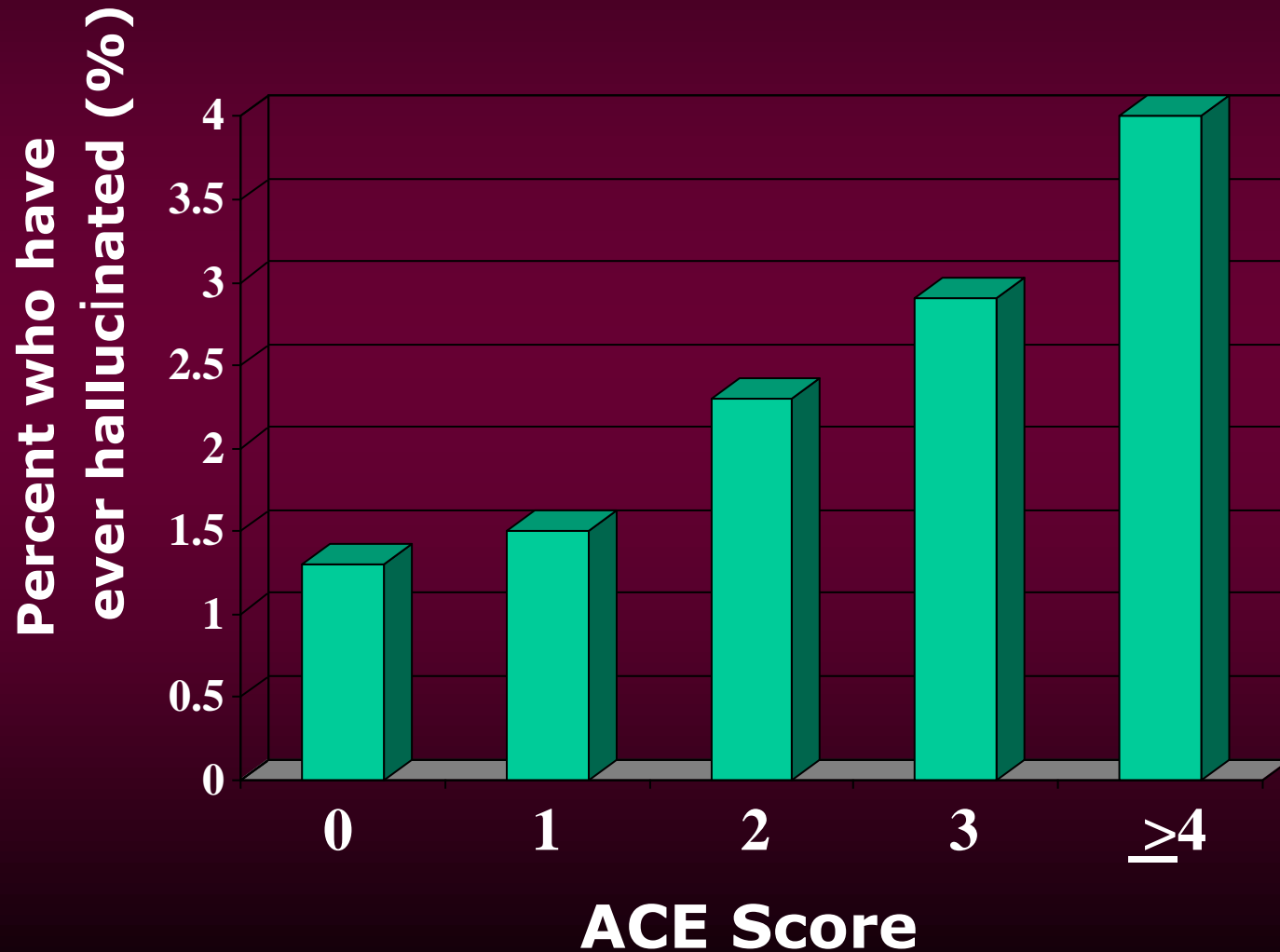


A Focus on Mental Health...

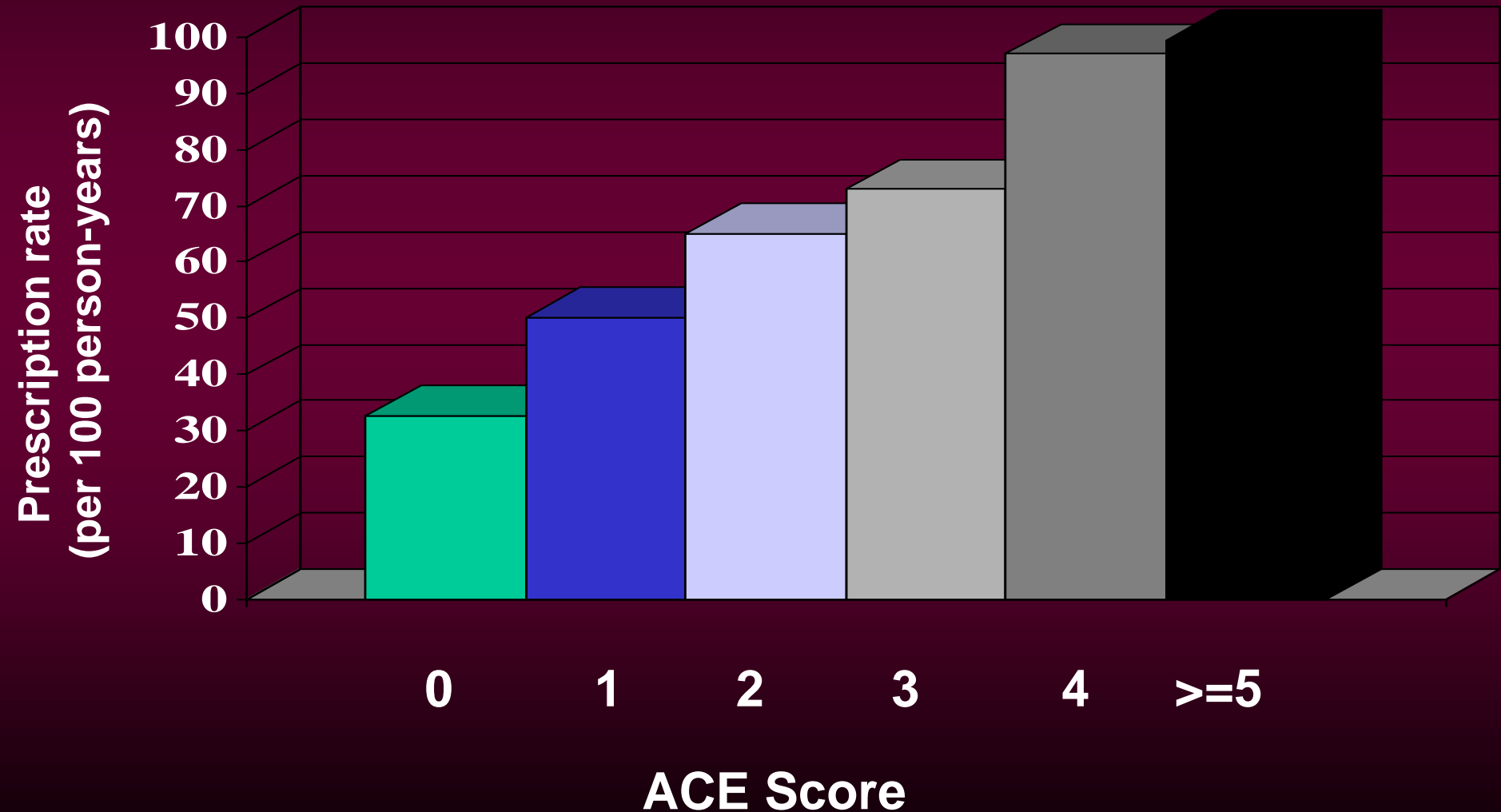
The ACE Score and a Lifetime History of Depression



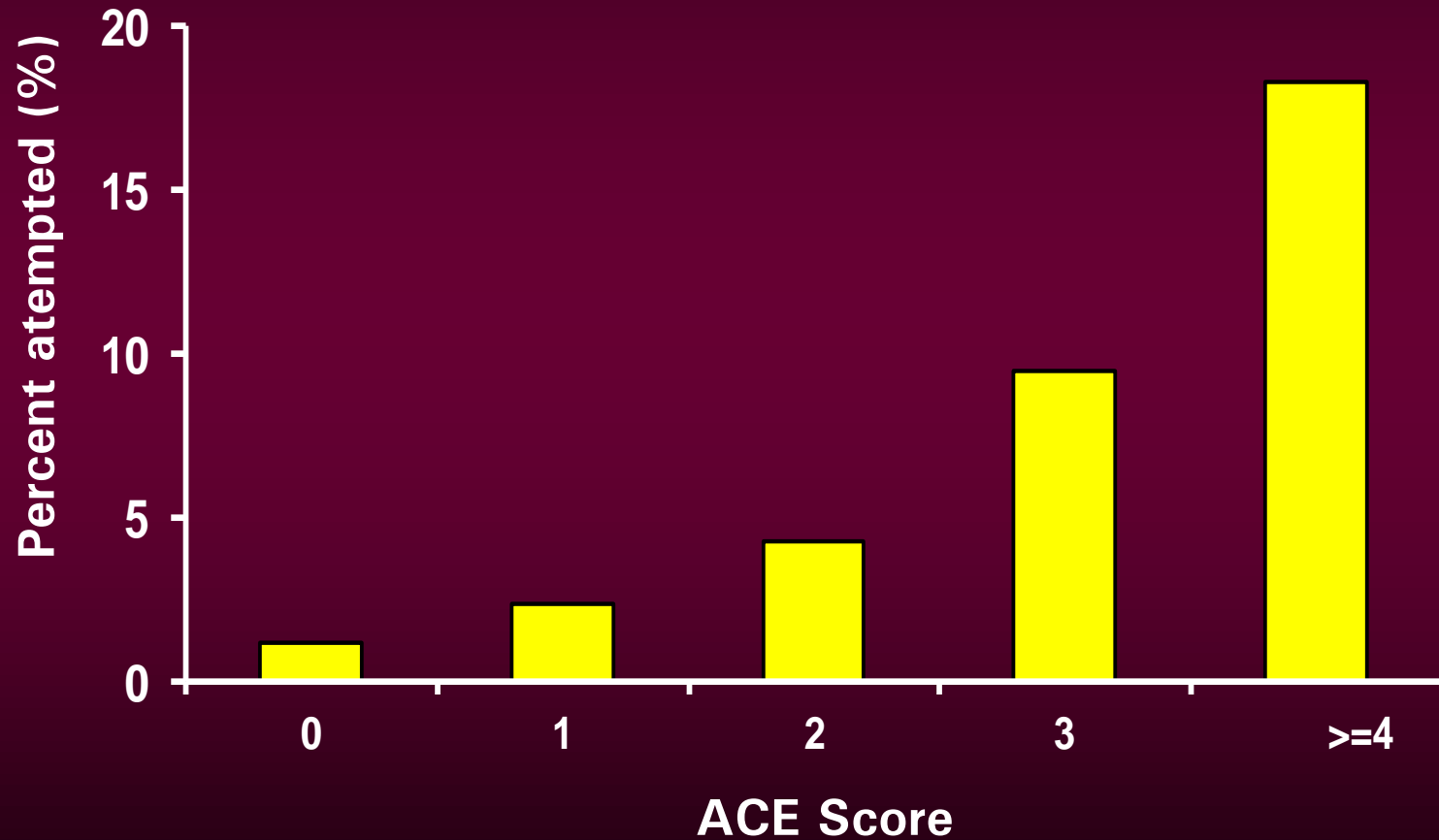
The ACE Score and a History of Hallucinations



ACE Score and Rates of Antidepressant Prescriptions



The ACE Score and the Prevalence of Attempted Suicide



Adverse Childhood Experiences As a National Health Issue

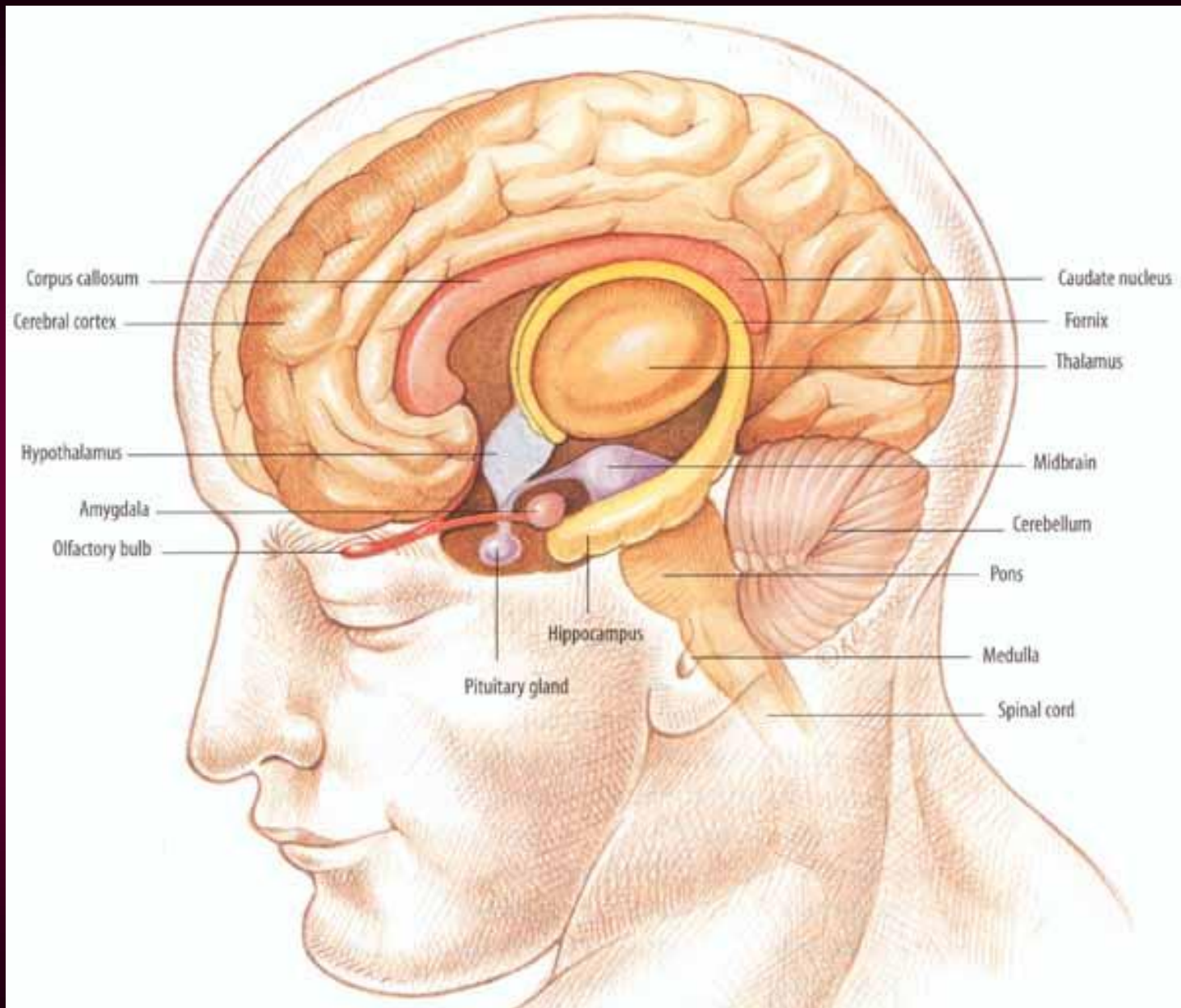
ACEs have a strong influence on:

- adolescent health**
- reproductive health**
- smoking**
- obesity**
- alcohol abuse**
- illicit drug abuse**
- sexual behavior**
- mental health**
- risk of violence and revictimization**
- stability of relationships**
- performance in the workforce**

Adverse Childhood Experiences As a National Health Issue

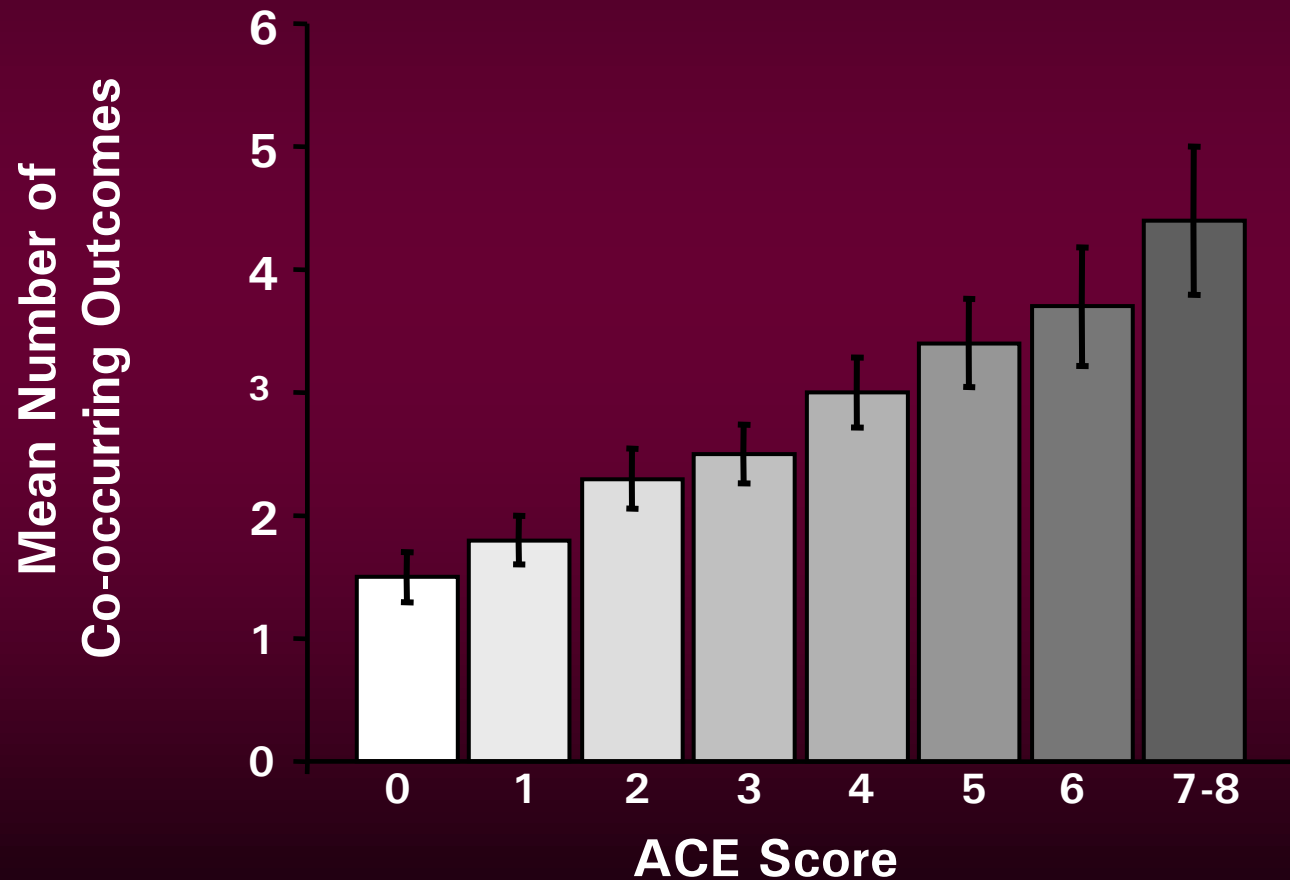
ACEs increase the risk of:

- Early death**
- Heart disease**
- Chronic Lung disease**
- Lung cancer**
- Liver disease**
- Autoimmune disease**
 - Suicide**
 - Injuries**
- HIV and STDs**
- other risks for leading causes of death**



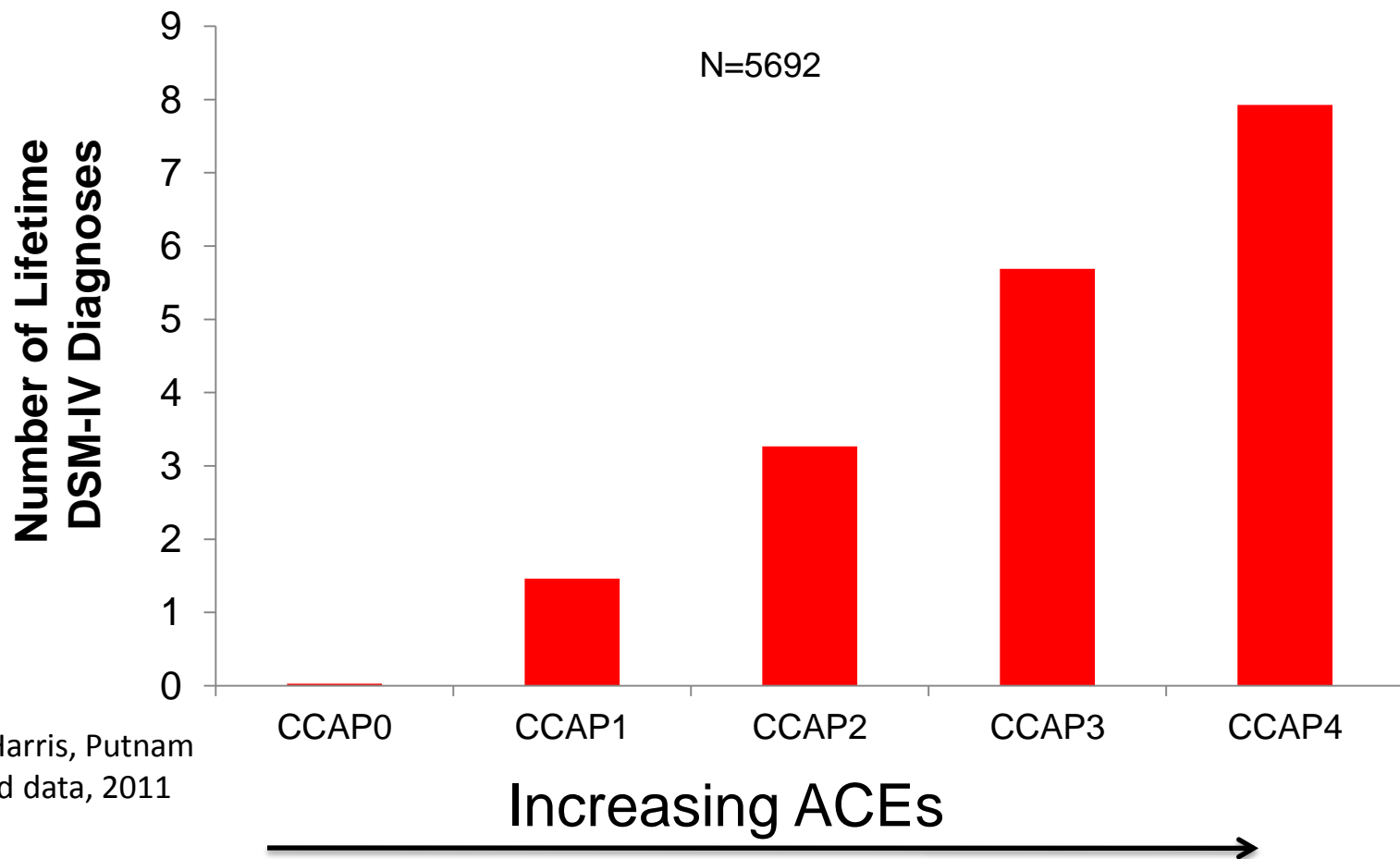
Neurobiology and Epidemiology Converge

*Complex Trauma—Trauma Spectrum Disorders
and the mean number of a **variety of problems***



Cumulative ACEs Increase Clinical Complexity in Terms of the Number of Lifetime DSM-IV Diagnoses*

National Comorbidity Survey – Replication Sample



*Putnam, Harris, Putnam
unpublished data, 2011



Art of Hieronymous Bosch

ACEs Changed the Landscape

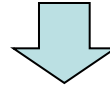
- Provided a compelling tabulation of childhood adversity that directly related to easily understood costly outcomes
- Largely responsible for increased awareness of policy makers of the role of childhood trauma in costly medical, psychiatric and social problems
- Legitimized and stimulated interest in childhood adversities for researchers in a range of fields

ACEs Changed the Landscape

- **Pervasiveness of ACEs**
 - Huge number of major public health problems that were ACE-related (e.g., Depression, Substance Abuse, STDs, Cancer, Heart Disease, Chronic Lung Disease, Diabetes)
 - Significant number of middle-class Americans had ACEs
- **Perniciousness of ACEs**
 - Major contributors to the leading causes of death and disability
 - Life-shortening (~20 years for people with 6+ ACEs)
- **Persistence of ACEs**
 - Life-time effects
 - Likelihood of intergenerational transmission

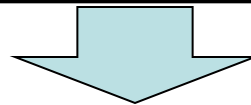
Adverse Childhood Experiences

- Abuse and Neglect (e.g., psychological, physical, sexual)
- Household Dysfunction (e.g., domestic violence, substance abuse, mental illness)



Impact on Child Development

- Neurobiologic Effects (brain abnormalities, stress hormone dysregulation, physical development)
- Psychosocial Effects (e.g., poor attachment, poor socialization, poor self-efficacy, revictimization)
- Health Risk Behaviors (e.g., smoking, obesity, substance abuse, promiscuity)



Long-Term Consequences

Disease and Disability

- Major Depression, Suicide, PTSD
- Drug and Alcohol Abuse
- Heart Disease
- Cancer
- Chronic Lung Disease
- Sexually Transmitted Diseases
- ***Intergenerational transmission of ACEs***

Social Problems

- Homelessness
- Prostitution
- Criminal Behavior
- Unemployment
- Parenting problems
- High utilization of health and social services

Beyond ACEs

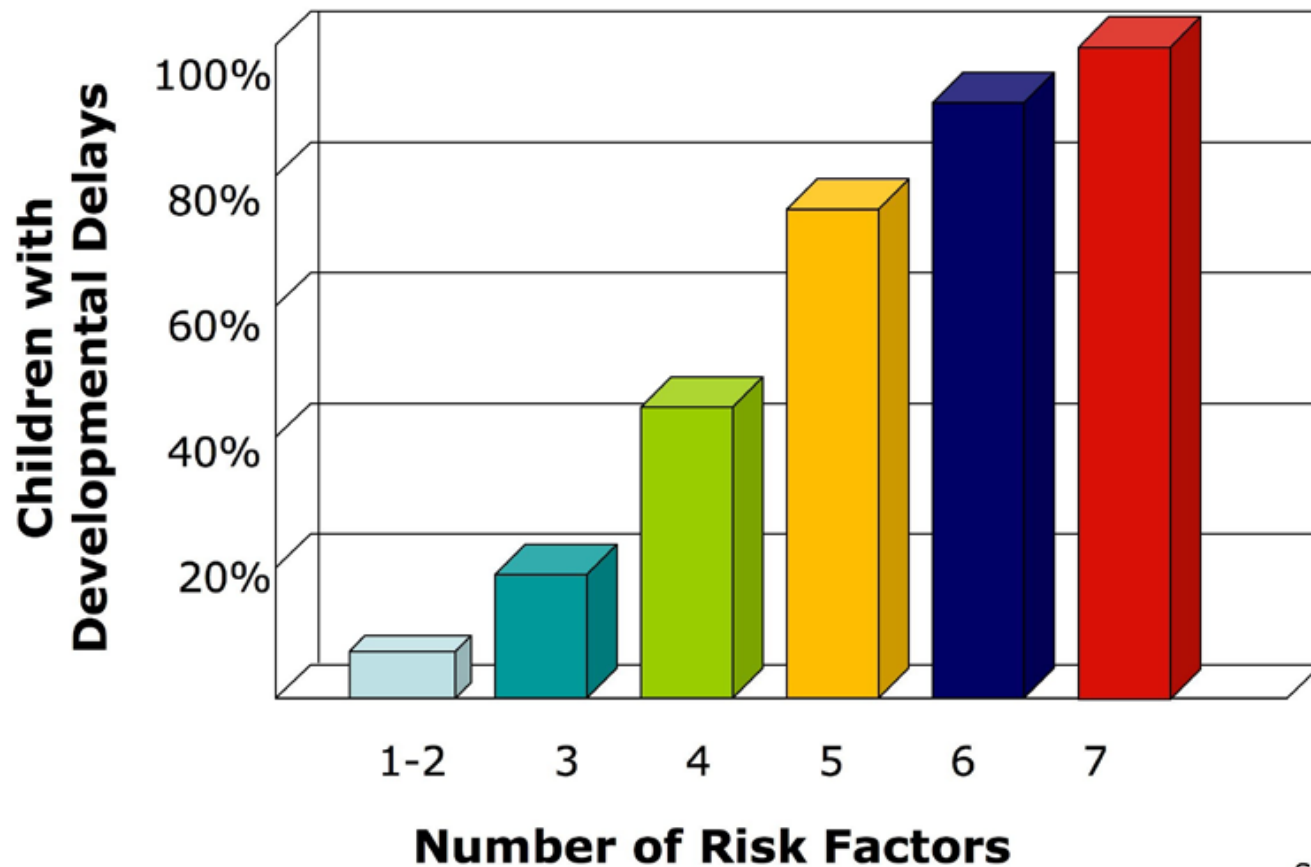
- Link ACEs to existing and future programs seeking to prevent mental illness, medical diseases, substance abuse, health risk behaviors, and social dysfunction
- Prevent ACEs
 - Zero ACEs is protective
 - Prevent further ACEs in maltreatment victims
- Identify and treat ACEs early in life
- Identify mechanisms (behavioral and biological) through which ACEs negatively impact life trajectories

The Costs of the Status Quo..

Reflect the Costs of
Ignoring and Impairing
Early Childhood Development



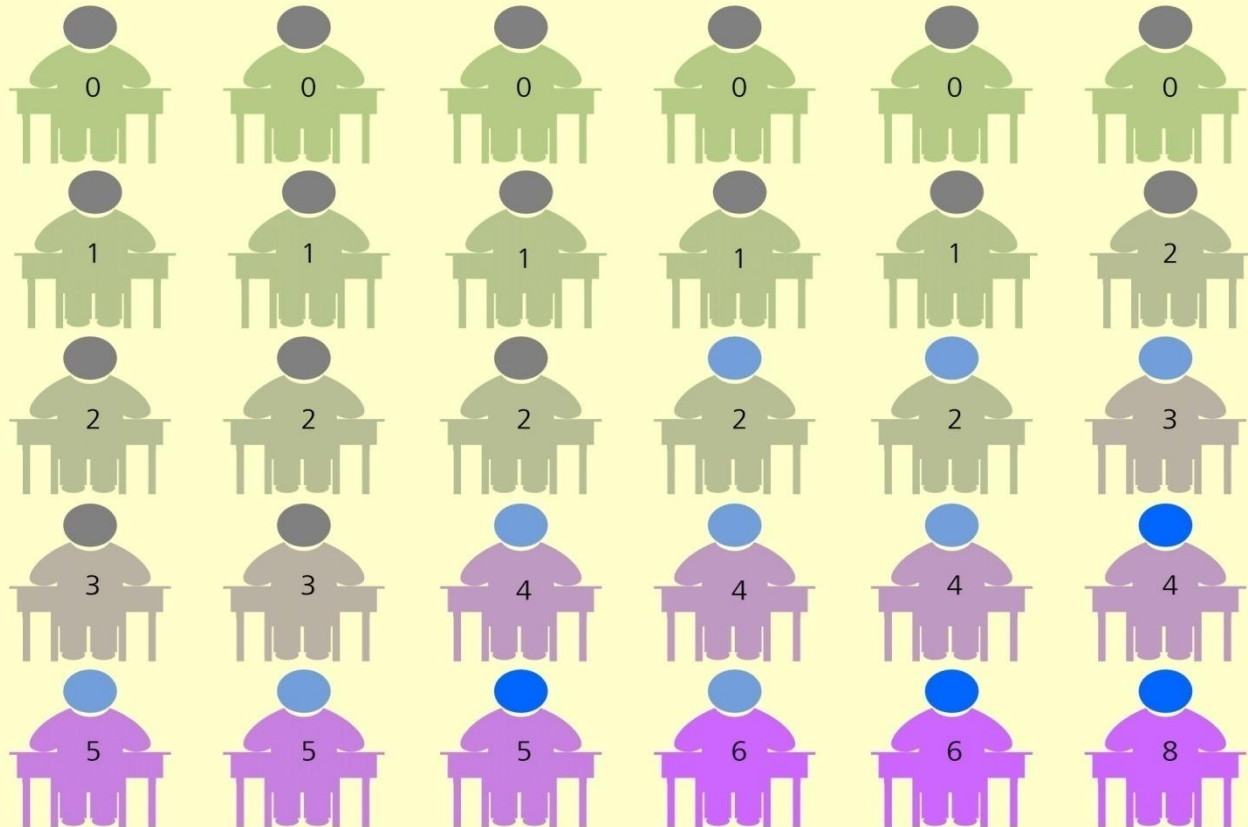
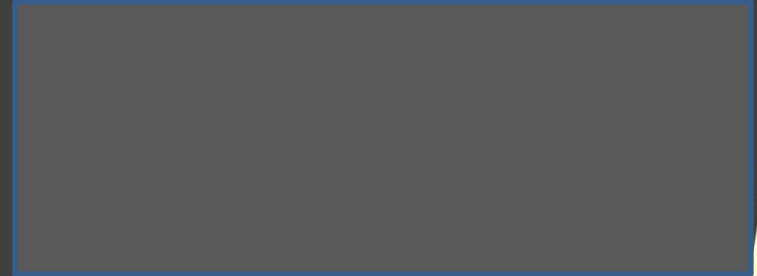
Significant Adversity Impairs Development in the First Three Years



ACEs and High School Sophomores and Seniors

Washington School Classroom (30 Students) Adverse Childhood Experiences (ACEs)

6 students with no ACE
 5 students with 1 ACE
 6 students with 2 ACEs
 3 students with 3 ACEs
 7 students with 4 or 5 ACEs
 3 students with 6 or more ACEs



Population
 Average

Spokane Washington

Students with ACEs:

- Are 2 ½ times more likely to fail a grade
 - Score lower on standardized tests
 - Have language difficulties
 - Are suspended or expelled more
- Are designated to special education more frequently
 - Have poorer health

Courtesy of Chris Blodgett, PhD
Washington State University

Costs of the Status Quo

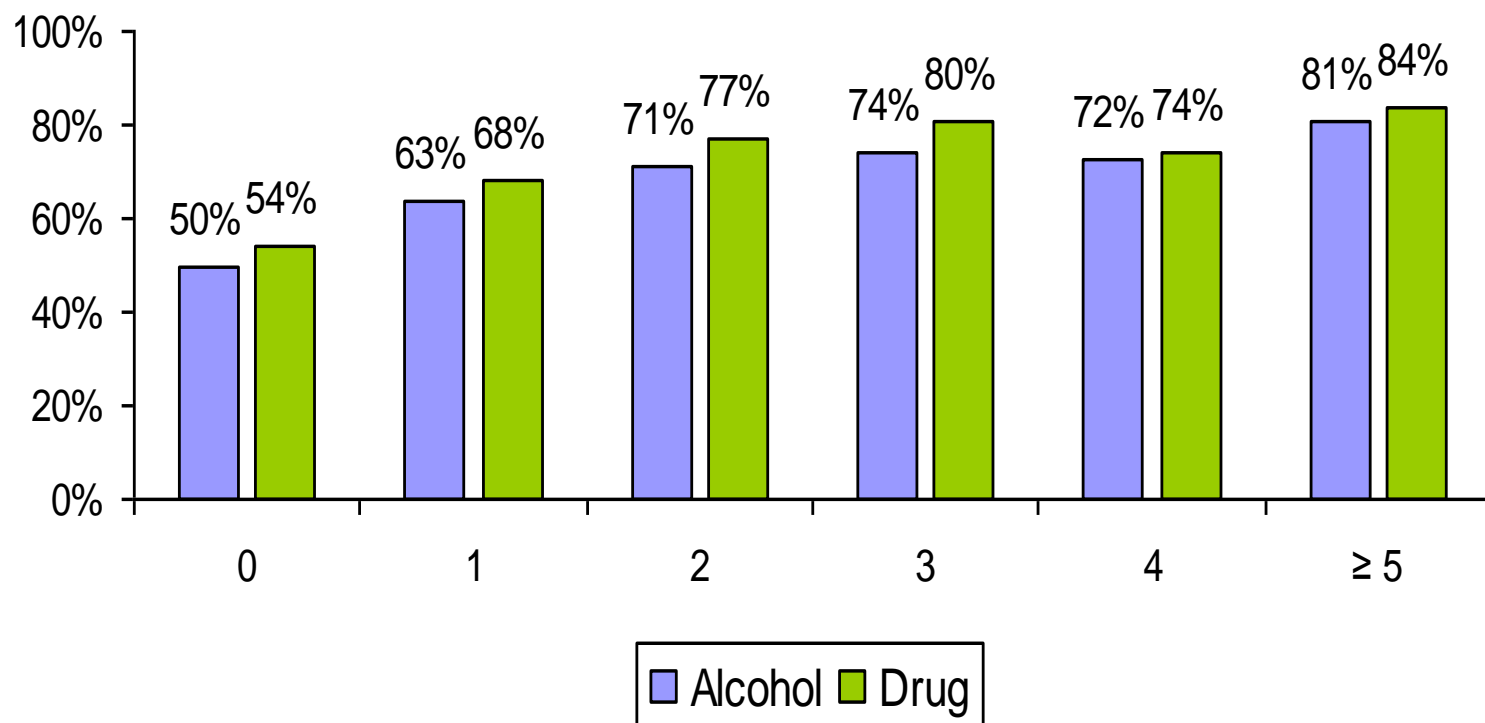
Criminal Justice

..the prison pipeline

ACEs Among Youth on Probation Pierce County, Washington

ACE Exposure and Youth Outcomes

History of Alcohol & Drug Use and ACE Score

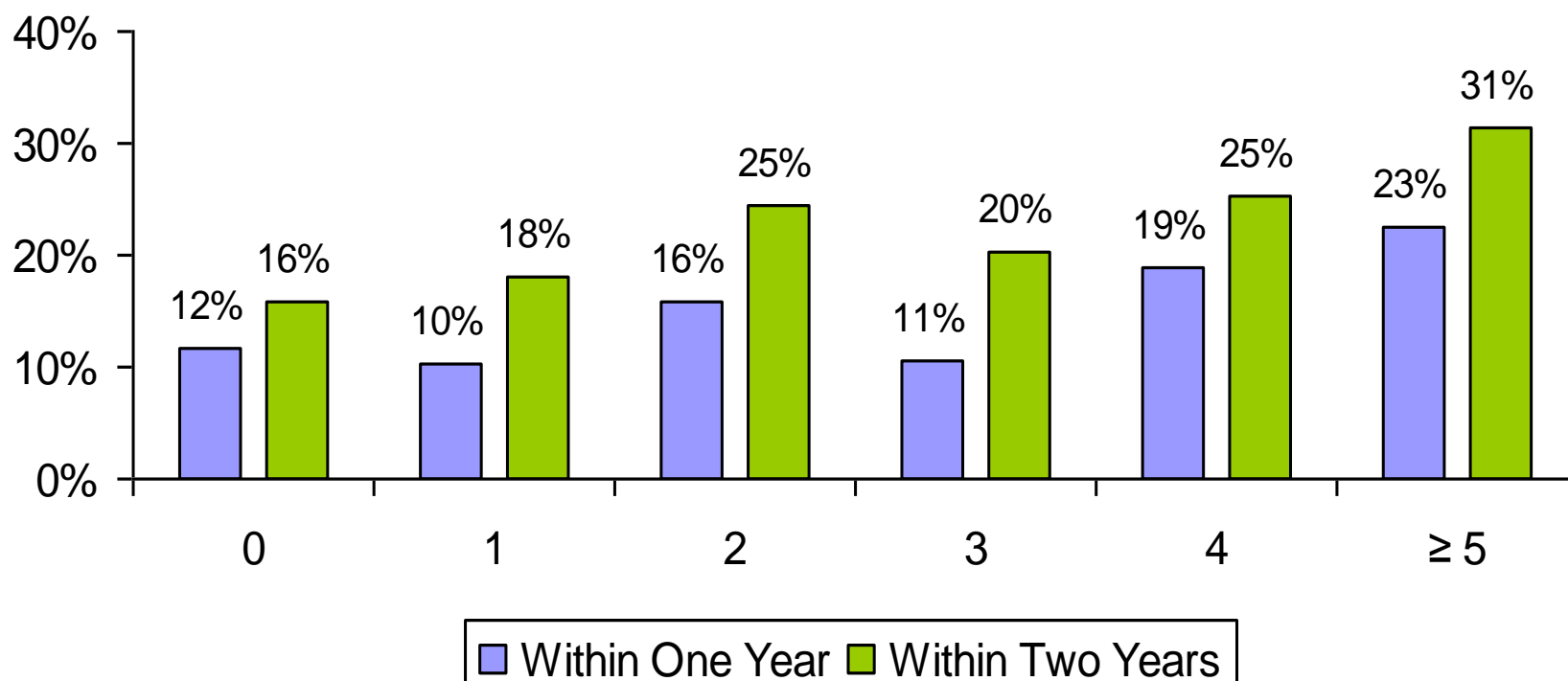




ACE Score and Felony Re-offense

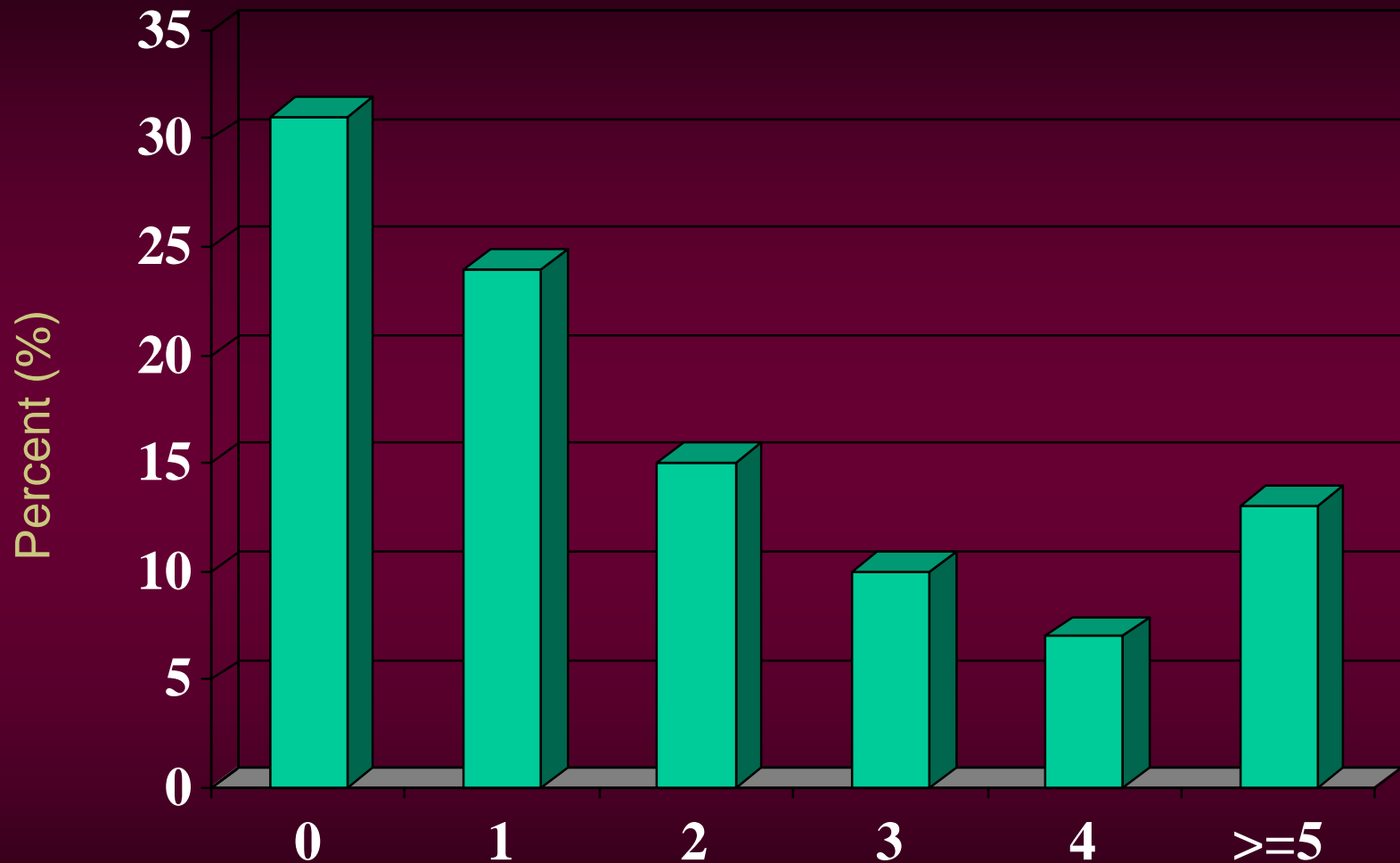
Tacoma
Urban
Network

Felony Re-offense Post Probation and ACE Score



**..the prison pipeline
extends into adulthood**

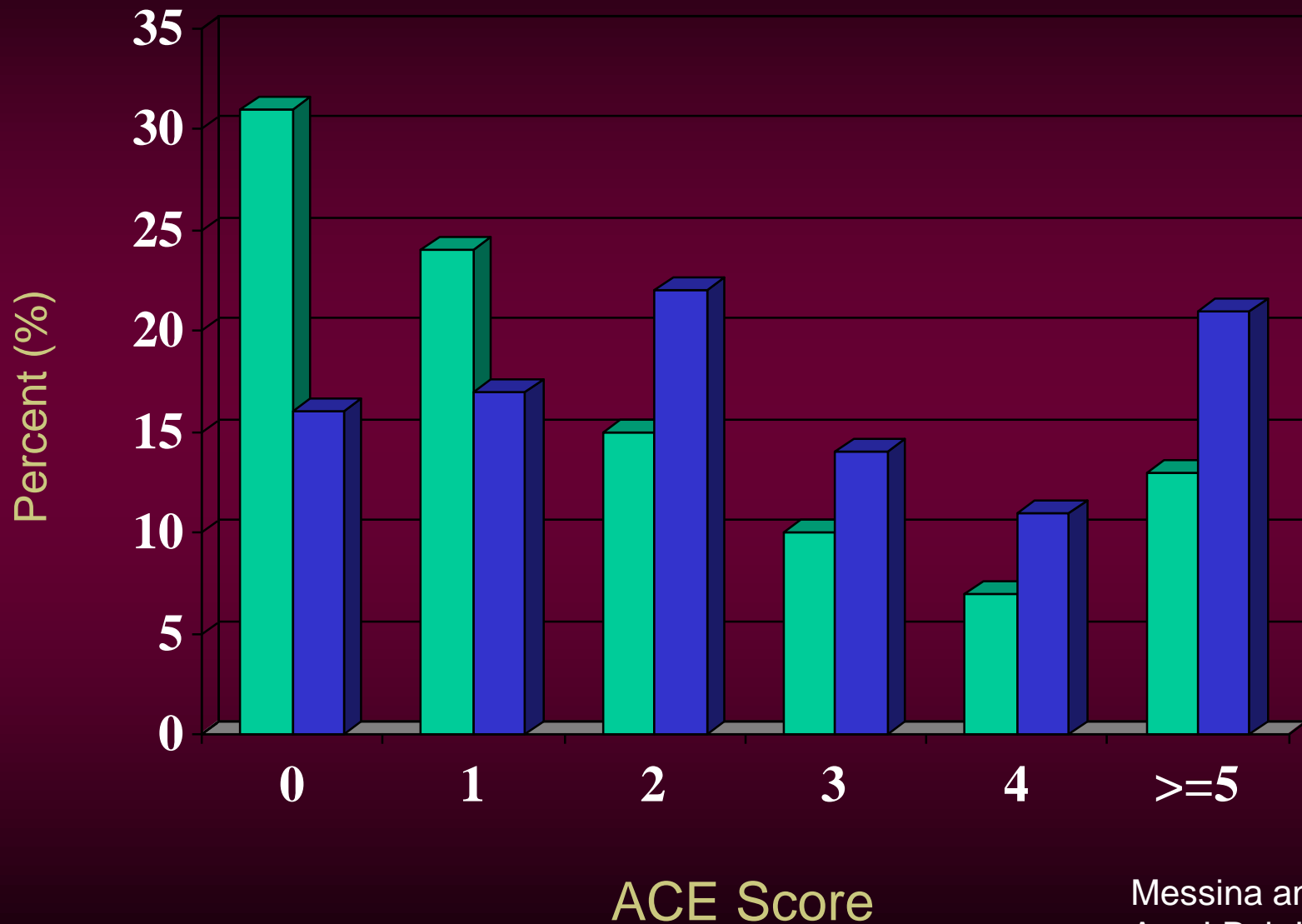
ACE Scores Kaiser Health Plan



ACE Score

Messina and Greila
Am J Pub Health
October, 2006

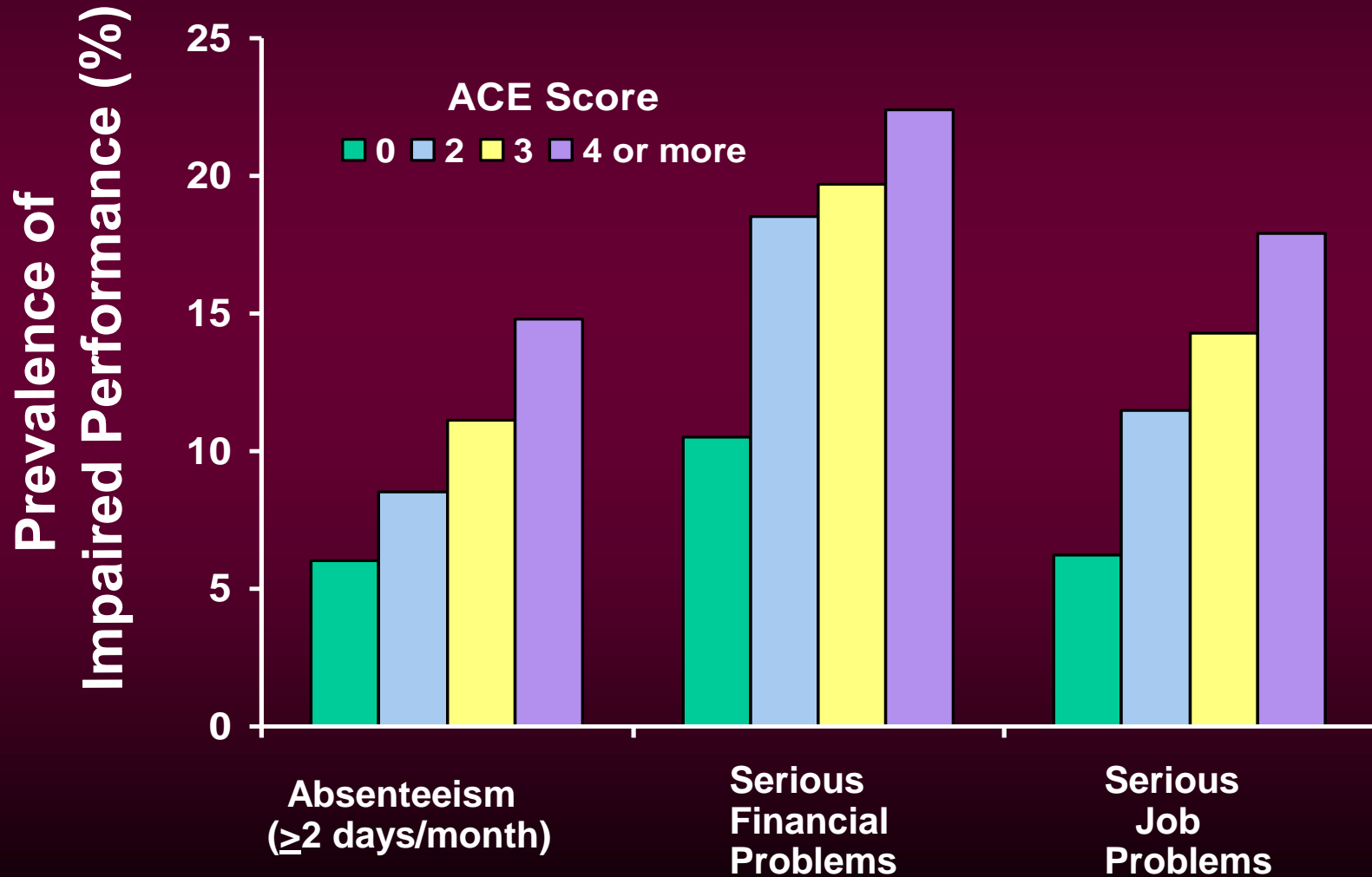
ACE Scores Kaiser vs Adult Women In Prison



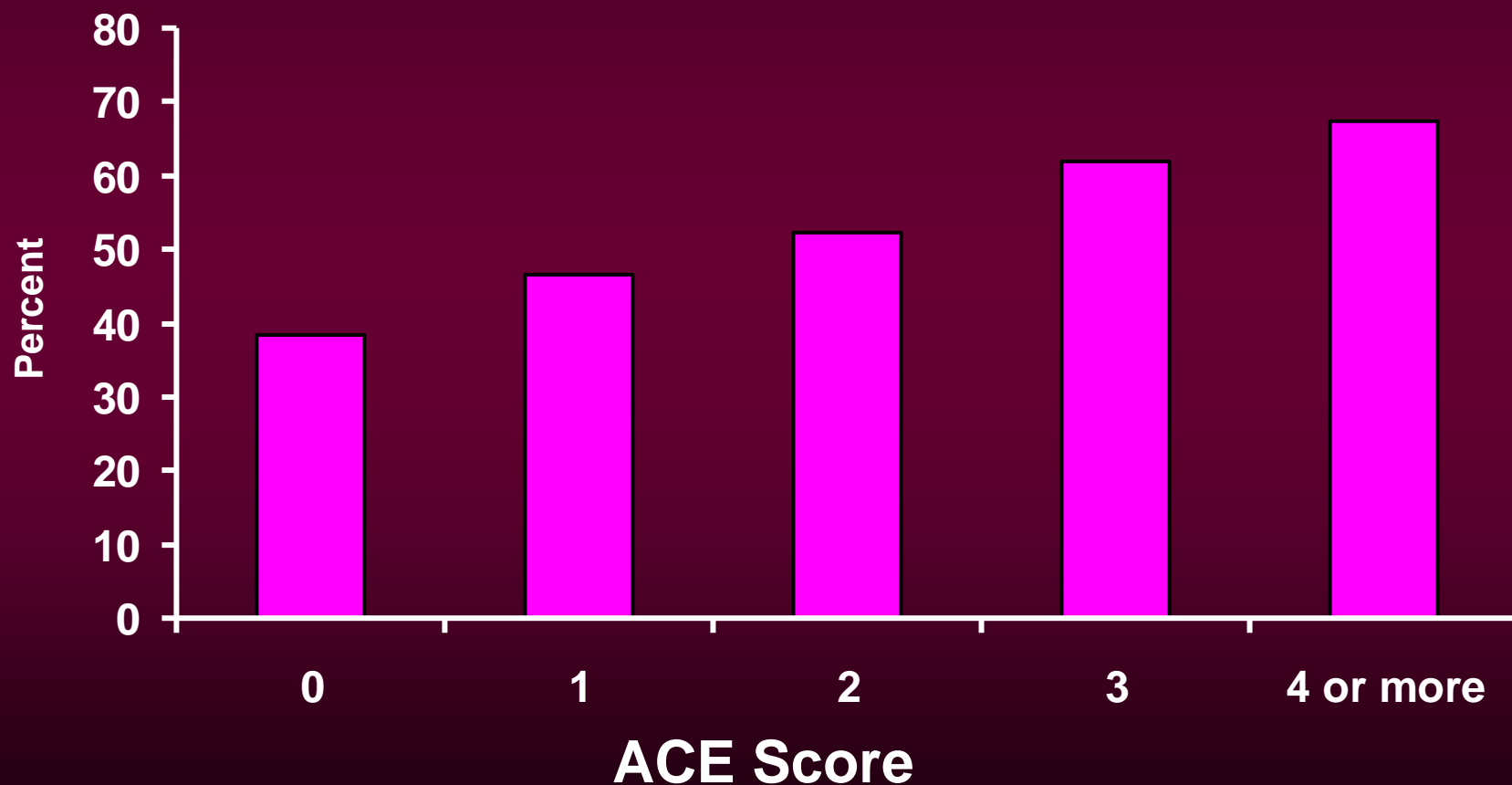
Messina and Greila
Am J Pub Health
October, 2006

**..the pipeline to
poverty and homelessness**

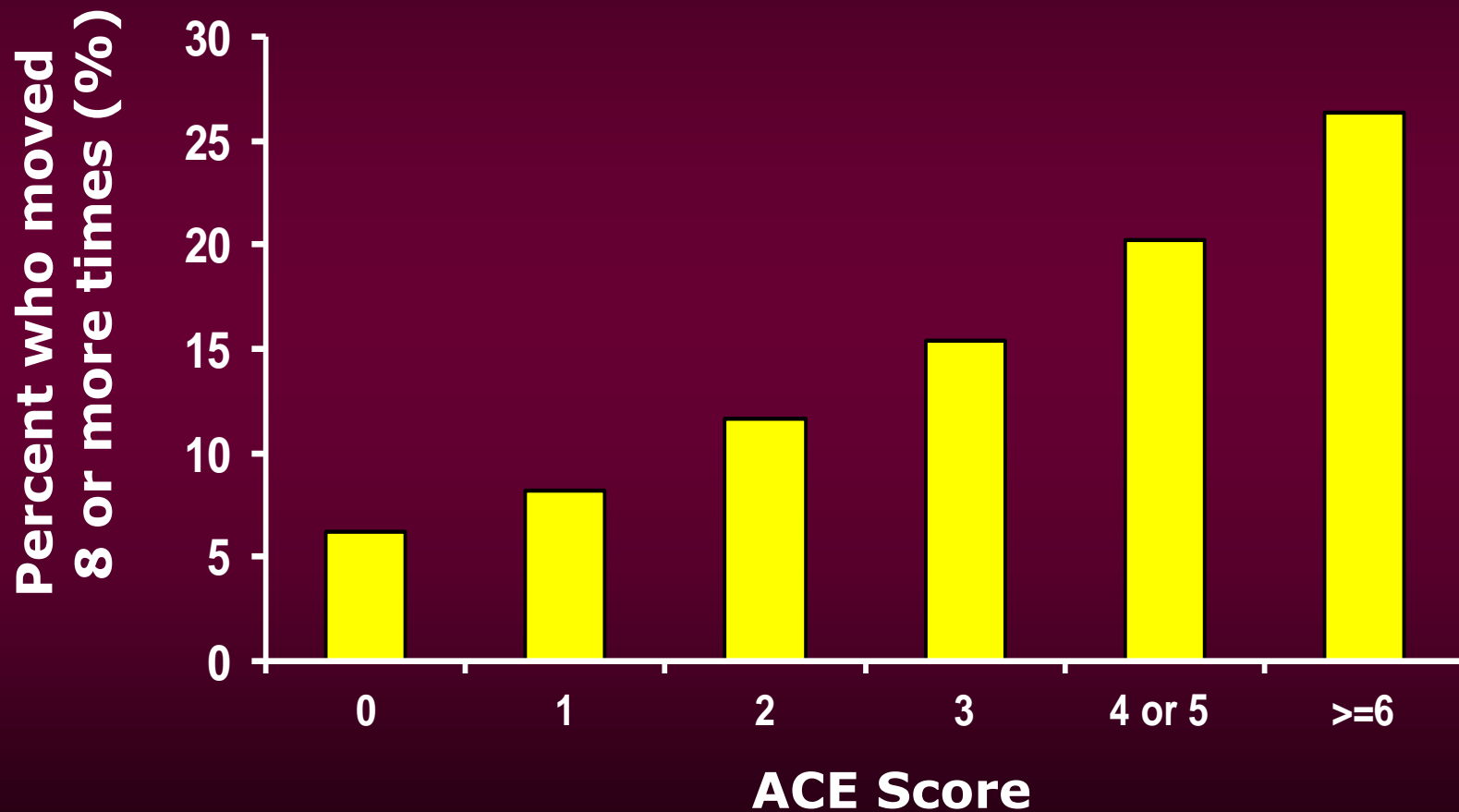
ACE Score and Financial Instability and Risk of Unemployment



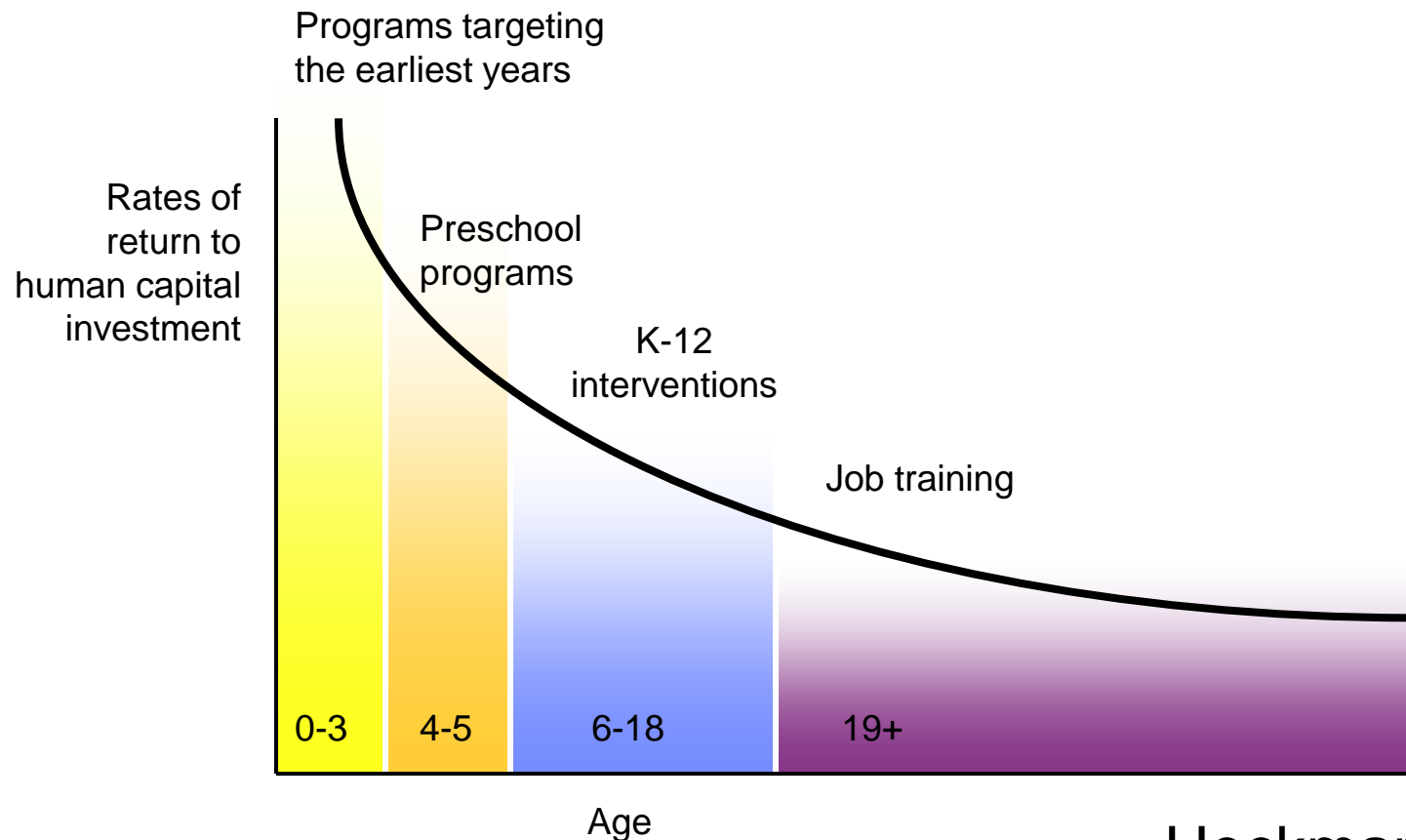
Percent of Women Who Ever Had an Unintended Pregnancy by ACE Score



High Residential Mobility (>8 moves) During Childhood by ACE Score



Preventive Intervention is More Efficient and Produces Higher Returns than Later Remediation



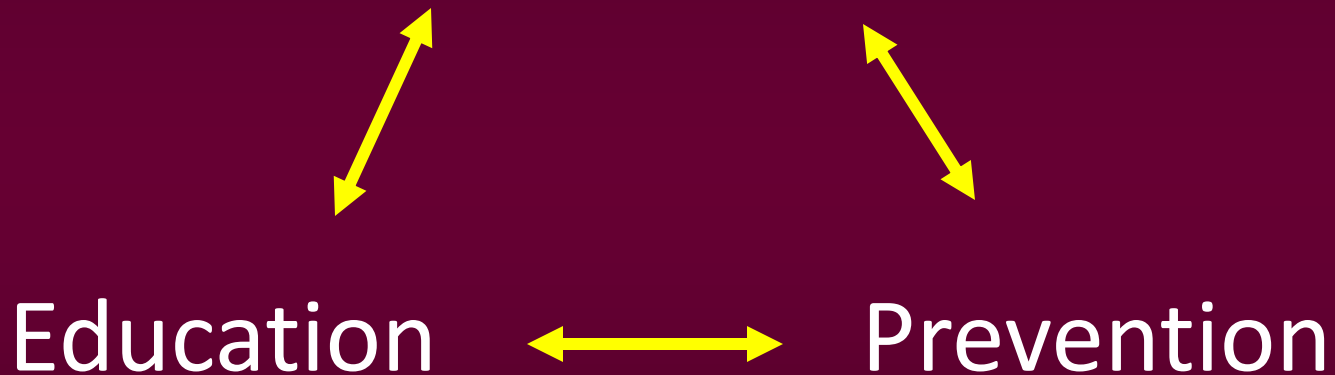
Heckman, J. (2007)



Beham, (Hans) Sebald (1500-1550): Hercules slaying the Hydra, 1545 from The Labours of Hercules (1542-1548).

A Public Health Framework For Change

Treatment



*All must consider
Intergenerational transmission*

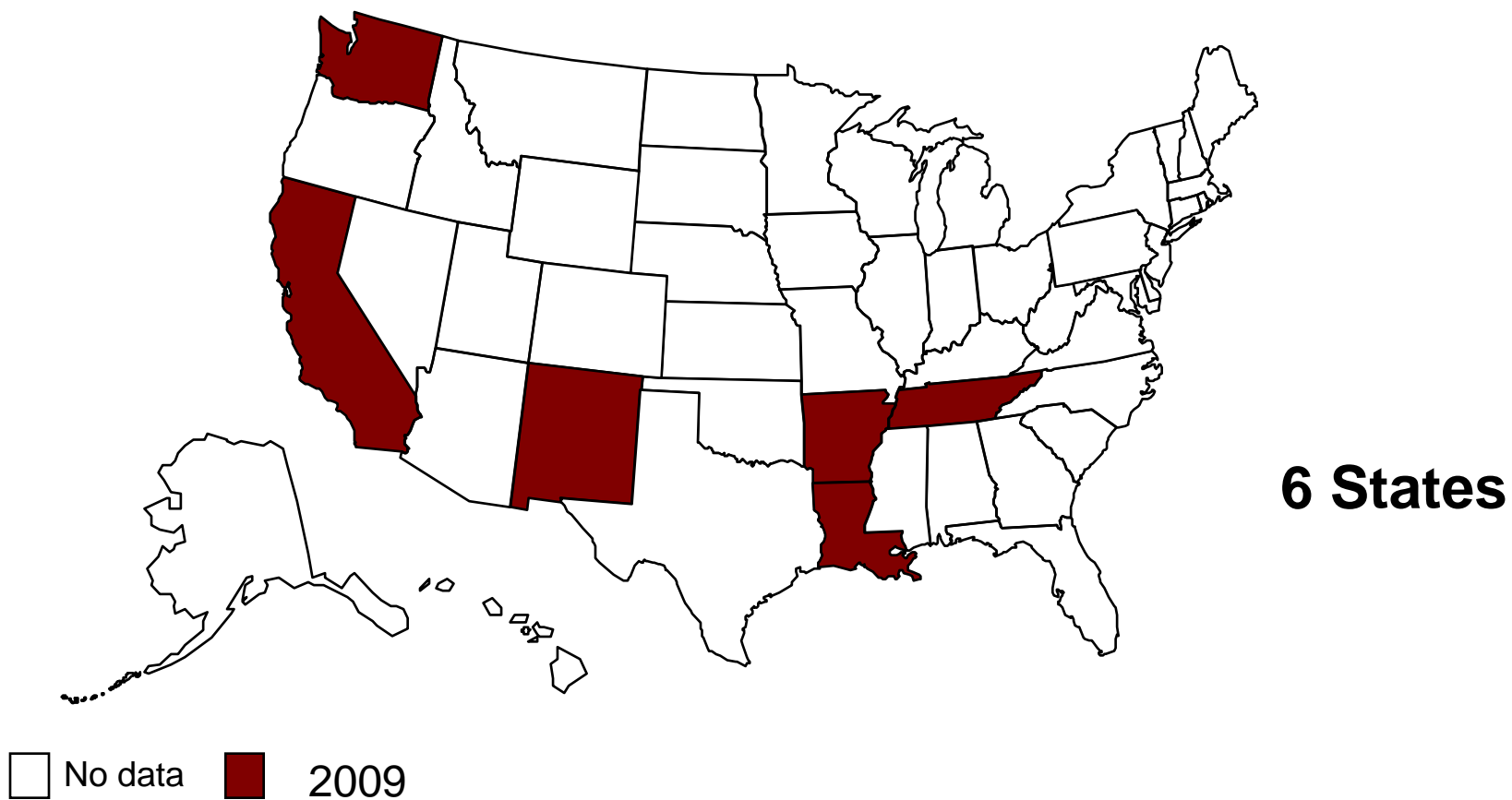
States With ACE Studies in 2008



☐ No data

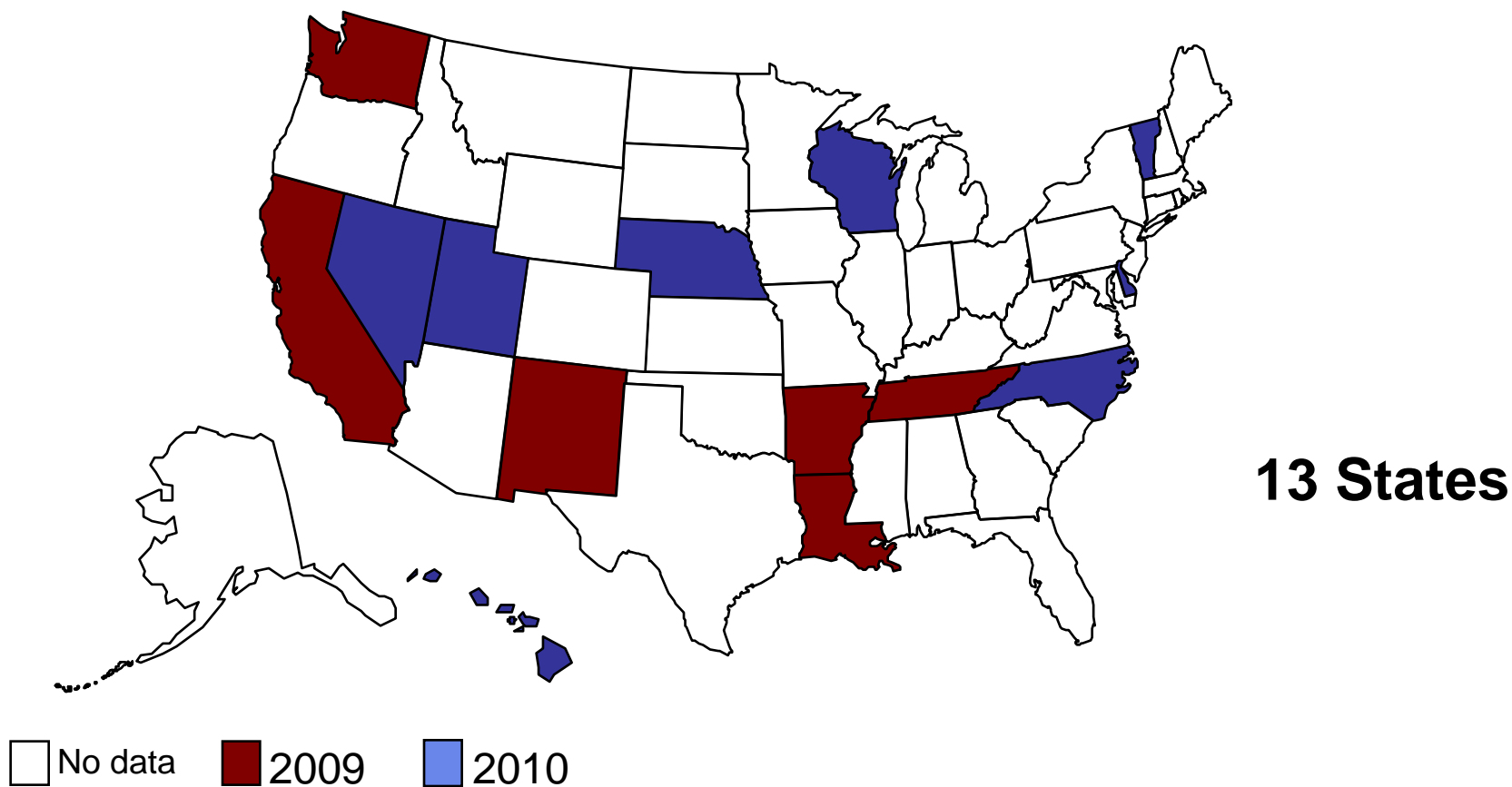
Source: Behavioral Risk Factor Surveillance System, CDC.

States With ACE Studies in 2009



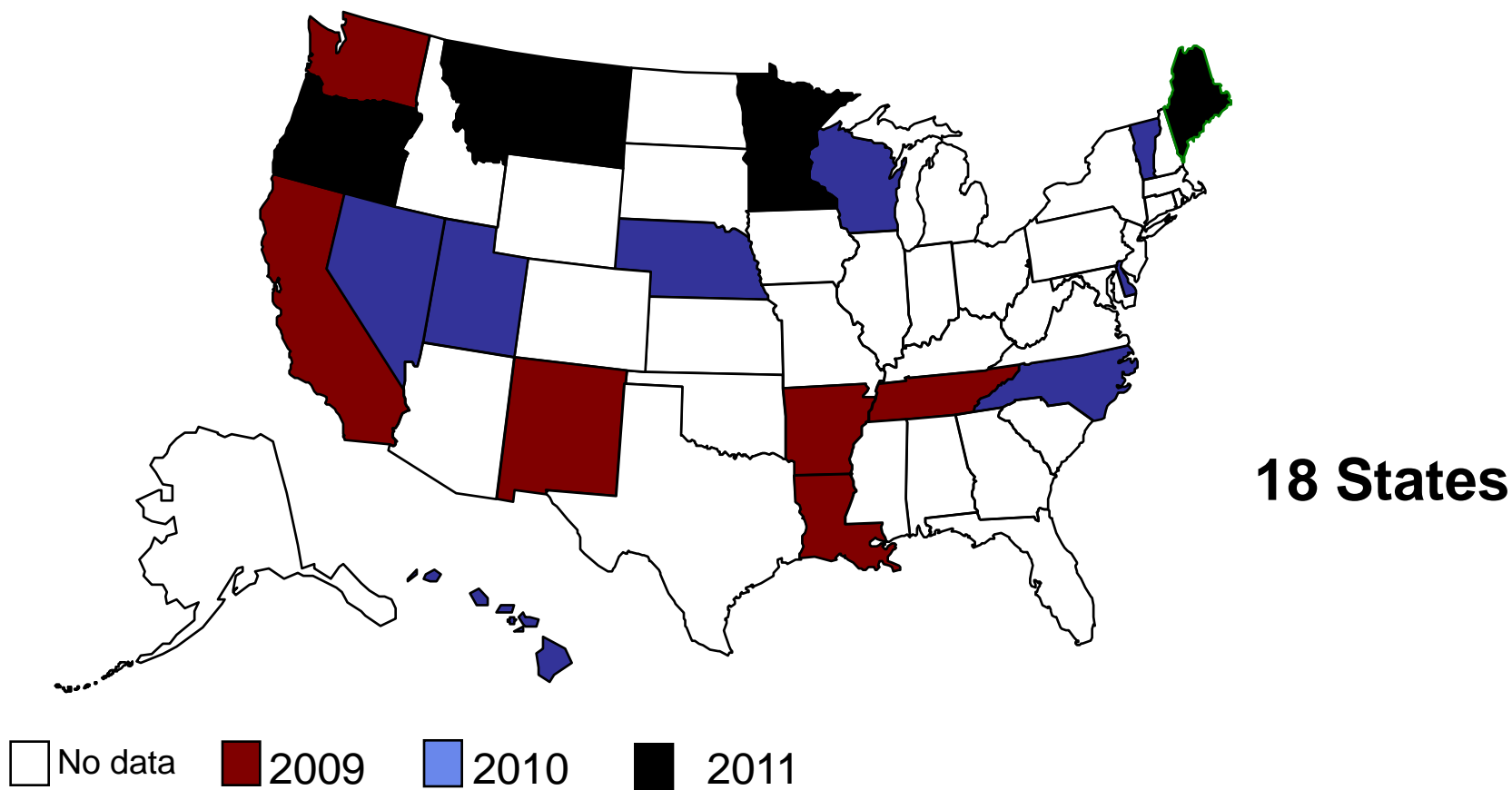
Source: Behavioral Risk Factor Surveillance System, CDC.

States With ACE Studies in 2009-2010



Source: Behavioral Risk Factor Surveillance System, CDC.

States With ACE Studies in 2009-2011



Source: Behavioral Risk Factor Surveillance System, CDC.